of the effects of catalyst concentration, reactant ratio, time, stirring and temperature showed that optimum conditions are: catalyst $\geq$5 mol%, $C_6H_{10}O:CH_3NO_2$ = 3:1, reaction time $\geq$6 days, and temperature not above room temperature. Stirring exerts a beneficial effect. There are 5 figures and 1 table.

ASSOCIATION: Kazanskiy khimiko-tekhnologicheskiy institut imeni S. M. Kirova (Kazan' Institute of Chemical Technology imeni S. M. Kirov)

SUBMITTED: December 2, 1961

SHEMSHURIN, N.A.

Why Leninsk Cotton Mill no.1 turns out low quality products.
Tekst.prom. 14 no.10:12-15 O '54. (MLRA 7:10)

1. Zamestitel' nachal'nika tekhnicheskogo otdela Glavzagotkhlop-proma.
(Leninsk--Cotton manufacture) (Cotton manufacture--Leninsk)

RODICHEV, S.D.; MERKIN, I.B.; MILOKHOV, N.I.; POPELLO, A.P.; SOLOV'YEV, N.D.; SHEMSHURIN, M.A.; SORKIN, N.B., retsenzent; SMIRNOV, I.I., retsenzent; ANDREYEV, Yu.I., retsenzent; BRAVYY, Z.A., retsenzent; SOKOLOVA, V.Ye., red.; MEDVEDEV, L.Ya., tekhn.red.

[Handbook on the primary processing of cotton] Spravochnik po pervichnoi obrabotke khlopka. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po legkoi promyshl., 1959. 687 p. (MIRA 13:4)
(Cotton gins and ginning)

SHAGIMARIN, N. A., Cand Tech Sci (diss) -- "Investigation of the residual fiber on cotton seeds". Tashkent, 1959. 21 pp (State Committee on Higher and Inter Spec Educ of the Council of Ministers Uzbek SSR, Tashkent Textile Inst), 150 copies (KL, No 10, 1960, 132)

SHERSHERIN, N.A., inzh.

Residual cottonseed linters and the ginning output. Tekst.prom. 19 no.4:19-22 Ap '59. (MIRA 12:6)
(Cotton gins and ginning)

SHEMSHURIN, N.A., kand. tekhn. nauk

Effect of the moisture of raw cotton materials on the amount of defects and impurities in cotton fibers. Tekst. prom. 22 no.7:20-22 Jl '62. (MIRA 17:1)

1. Zamestitel' nachal'nika Gosudarstvennoy inspektsii po kachestvu tekstil'nogo, kozhevennogo i pushno-mekhovogo syr'ya.

SHEBERSTOV, N.A., kand. tekhn. nauk

More about the yield of cotton filaments. Tekst. prom. 24 no.3:82-84 Mr '64. (MIRA 17:9)

1. Zamestitel' nachal'nika Gosudarstvennoy inspektsii po kachestvu tekstil'nogo kozhevennogo i pushno-mekhovogo syr'ya.

L 07335-67 EWT(1) GW

ACC NR: AP6012112 SOURCE CODE: UR/0413/66/000/007/0022/0022

AUTHORS: Kaplunov, A. I.; Veksler, B. Ye.; Volkhonskiy, V. M.; Revennikov, V. S.; Shemshurin, S. V.

ORG: none

TITLE: Thermostabilized generator for a seismic core probe. Class 21, No. 180221

SOURCE: Izobreteniya, promyshlennyye otraztsy, tovarnyye znaki, no. 7, 1966, 22

TOPIC TAGS: seismologic instrument, electronic oscillator

ABSTRACT: This Author Certificate presents a thermostabilized generator for a seismic core probe. The tank circuit contains a ferrite trimmer and an induction coil placed on a ferrite core with a gap (see Fig. 1).

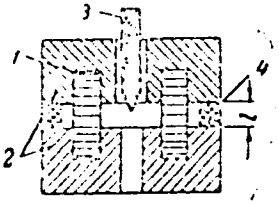

Fig. 1. 1 - induction coil; 2 - core; 3 - trimmer; 4 - gasket

To stabilize the generated frequency in a wide range of temperatures, the core gap has a height of 0.05 to 0.2 times the height of the core. A nonmagnetic ring gasket is placed between the outer walls of the core cups. Orig. art. has: 1 diagram.

AUTHOR: None given 5-3-14/37

TITLE: Chronicle of the Hydrogeological Section (Khronika gidrogeologicheskoy sektsii)

PERIODICAL: Byulleten' Moskovskogo Obshchestva Ispytateley Prirody, Otdel Geologicheskiy, 1957, No 3, pp 159-160 (USSR)

ABSTRACT: The following reports were delivered at the meeting of the Hydrogeological Section, Moscow Society of Naturalists, from 14 February to 21 March 1957: I.G. Glukhov on "Loesses of Water Origin in Some Regions of Central Asia"; Yu.V. Mukhin on the "Influence of Natural Fluctuations of the Underground Water Level on the Discharge of Wells and Other Water Collectors"; V.A. Shemshurin on "Hydrogeological Calculation of the Underground Discharge of the Yakh-Su River (Central Asia) by Electric Survey Data"; V.V. Ivanov on "Vertical Hydrochemical Zonation in Regions of Active Volcanos"; B.P. Bulavin on "Problem of Loessial Soil Sagging in Connection with Observations on the Lower-Don Canal", and A.S. Ryabchenkov on the "Mineralogical and Petrographic Composition and Origin of Loessial Rocks of the Donets Ridge".

AVAILABLE: Library of Congress

Card 1/1

SHEMSHURIN, Vladimir Andreyevich; BORUSHKO, T.I., red. izd-va; GUROVA, O.A., tekhn.red.

[Methodological handbook on prospecting with radio waves in searching for underground waters in an arid zone]Metodicheskoe rukovodstvo po radiovolnovomu zondirovaniiu (RVZ) pri razvedke podzemnykh vod v aridnoi zone. Moskva, Gosgeoltekhizdat, 1962. 45 p. (MIRA 15:10)
(Electric prospecting) (Water, Underground)

SHEMSHURIN, V.A., inzh.

The relation between the coefficient of permeability and the specific resistance of ~~sandy-clay strata~~. Gidr.stroi. 32 no.9:36-39 S '62. (MIRA 16:2)

(Soil percolation)

SHEMSHURIN, V.A.; OGIL'VI, N.A., nauchn. red.; ZHARKOVA, A.P., tekhn. red.

[Survey of abstracts and bibliography on the use of geophysical methods in engineering geology and hydrogeology, based on material published between 1940-1959] Referativnyi obzor i bibliograficheskii ukazatel' primeneniia geofizicheskikh metodov v inzhenernoi geologii i gidrogeologii; po materialam, opublikovannym v pechati s 1940-1959 g. Moskva, 1962. 67 p. (MIRA 16:7)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut gidrogeologii i inzhenernoy geologii.
(Bibliography--Prospecting--Geophysical methods)

OL'KHOVA, A., kand.arkhitektury; SHEMSHURINA, Ye., kand.arkhitektury

Houses and apartments in Caracas, capital of Venezuela. Zhil. stroi. no.11:26-30 '58. (MIRA 12:6)
(Caracas--Apartment houses)

KHAL'FA, Yu.A., inzh.; SHEMSHURINA, Ye.A., red.; KOGAN, F.L., tekhn. red.

[Rear-engine automobiles; a survey] Avtomobili s zadnim raspolozheniem dvigatelia; obzor. Moskva, TSentr. in-t nauchno-tekhn. informatsii mashinostroeniia, 1962. 66 p. (Seriia XII: Avtomobilestroenie) (MIRA 17:4)

SHEMTOV A Z.

Approximate Determination of the Natural Tangential Frequency of Vibration of Short Steam-Turbine Blades. (In Russian.) A. Z. Shemtov. *Boiler and Turbine Construction* (U.S.S.R.), Feb. 1947, p. 29-31.

Method described is based on the relationship between the natural frequency and the elasticity. Data thus obtained are tabulated and charted.

Leningradskiy nauchno-issledovatel'skiy kotloturbinnyy institut imeni I. I. Polzunova

PAGE I BOOK EXPLOITATION SOV/4017

Issledovaniya alternativnykh radiyev i gazovykh turbin i osevykh kompressorov (Investigations of the Components of Steam and Gas Turbines and Axial-Flow Compressors) Moscow, Mashgiz, 1950. 488 p. (Series: Trudy Instituta, No. 6) Errata slip inserted. 3,200 copies printed.

Sponsoring Agency: None. Scientific Ed.: Candidate of Technical Sciences, Ed. of Publishing House: V. B. Shneyerovich; Tech. Ed.: N. Ya. Simonovskiy; Tech. Ed. for Literature on the Design and Operation of Machines (Design, Ed. for Literature on the Design and Operation of Machines (Design, Manufacture, and Exploitation): P. I. Petrov; Chief Ed. of Publishing House: A. S. Zil'berman; Engineer: V. K. Naumov; Chief Ed. of Technical Sciences: K. M. Rozin; Engineer: V. K. Shibkov.

PURPOSE: This collection of articles is intended for engineering and technical personnel of turbine-construction plants and power plants employing steam and gas turbines.

COVERAGE: The collection contains 13 reports which present the results and findings of investigations of the working process and the strength of components of turbine and axial-flow compressors. Also described are test methods, devices, and apparatus. The first part of the collection deals with the aerodynamics of turbine and compressor cascades. The following members of the aerodynamic, compressor, and turbine laboratories took part in the work: D. M. Reshet'ko, V. A. Zvonilovskiy, V. A. Ruskova, the technicians T. Ya. Kiyanova, V. A. Kashirin, K. I. Yazerova, and Engineers N. K. Rutsayev, and I. M. Yefimov. The second part of the collection consists of reports on the work of the laboratory of the Design Office for Steam and Gas Turbines (Central Scientific Research Institute imeni I. I. Polzunov) and the laboratory of Strength of Metals (Physical Institute) connected with the study and development of turbine components, particularly blades. The following members of the vibration laboratory of the Design Office for Steam and Gas Turbines took part in the work: Engineers L. D. Novikova, G. L. Ivulin, P. G. Melent'yev, technicians and workers A. N. Krasnoshchekov, V. I. Melent'yev, V. D. Kuznetsov, and Ye. P. Kalinovskiy. The third part contains articles on the work of the laboratory of Strength of Metals and the Design Office for Steam and Gas Turbines. Personalities mentioned are V. V. Uvarov, Professor, Doctor of Technical Sciences, Prize Winner of the Stalin Prize, and Ye. V. Kalinin, Professor, Doctor of Technical Sciences, Prize Winner of the Stalin Prize. The articles were reviewed by the Machine-Component Laboratory of the Leningrad Metal Plant imeni V. I. Lenin. Prof. V. P. Agapkin, Doctor of Technical Sciences, Prize Winner of the Stalin Prize, the leading Innovators Ye. V. Prozorov and V. P. Kuznetsov, and Engineer V. A. Kuznetsov were also mentioned. References are to Soviet publications in Russian. 43 articles.

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Card 6/13

SHEMTOV, A.Z., kand.tekhn.nauk

Measuring dynamic stresses in moving blades and other parts of turbines under operating conditions. [Trudy] LMZ no.6:169-192 '60.
(MIRA 13:12)

(Turbines)

SHEMTOV, A. Z., kand. tekhn. nauk

Taking into consideration the rigidity caused by fastening wires in calculating the bending and the tangential vibration within blading sections. [Trudy] LMZ no.6:222-231 '60. (MIRA 13:12)
(Blades—Vibration)

5.3700(C)

~~5(3)~~ SOV/20-130-2-27/69

AUTHORS: Titov, A. I., Lisitsyna, Ye. S., Shemtova, M. R.

TITLE: Some Coservations Concerning the Chemistry of Ferrocene

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 130, Nr 2, pp 341 - 343 (USSR)

ABSTRACT: The authors succeeded in producing ferrocene in a yield amounting to 90% of the theoretical one (Ref 1) (see Experiment Nr 1). The cobalt-containing analog was produced in a very simple way as $(C_5H_5)_2Co^+Br_3^-$ (Experiment Nr 2) while the ferrocene was transformed almost quantitatively into the ferricinium salt $(C_5H_5)_2Fe^+FeCl_4^-$ (Experiment Nr 3). The synthesis of 1,1'-dinitroferrocene by the reaction of $FeCl_2$ with sodiumnitrocyclopentadienate was not possible. As is known, ferrocene could not be nitrated (Refs 2,3), it was only transformed into ferrocinium cation. The authors observed that this process with diluted nitric acid is practically based on autocatalytic reaction with nitrogen dioxide (see Scheme). In the presence of hydrazine, the oxidation nearly stops. An addition of urea acts weakly. Con-

Card 1/4

sidering outer characteristics and the formation of iron cations the action of HNO_3 on the ferricinium cation leads to transformation products of nitrocyclopentadiene. In the reaction of ferrocene with reagents introducing the nitroso group such as nitrosyltetrafluoroborate $NO^+BF_4^-$, a radical-like nitrogen oxide is separated out. The interaction of ferrocene with the NO_2^+ of various nitration agents in the first stage must proceed in a similar way. Ferricinium cation also developed under the action of aluminum chloride solutions in thionyl chloride, in phosphorus trichloride, and in phosphorus oxychloride on ferrocene, probably due to the reaction with cations of the type $SOCl^+$, PCl_2^+. Considerable amounts of sodiumnitrocyclopentadienate and (after treatment with water) iron hydroxides were formed by a 2-day action of ethyl nitrate in the presence of sodium ethylate or sodium tertiary butylate, solved in the corresponding alcohol. Without alcoholate, no reaction with ethyl nitrate occurred, even in acetic-acid anhydride. It is possible that the activat-

ing action of the alcoholate is based on its complex formation with ferrocene due to the interaction with a cationoid Fe-atom (see Scheme), and on an increase in nucleophilic capacity of the C_5H_5-radicals. Thus, these radicals are adapted even more to the state of the $C_5H_5^-$ anion. As is known, a free cyclopentadienate ion reacts quickly under such circumstances to form a nitro derivative (Ref 4). The authors produced disulfonic acid in a yield up to 80% of the theoretical one by sulfonation of ferrocene in acetic-acid anhydride at 0° for 2.5 h. Iron cations were, however, formed at the same time. The method of producing ferrocenaldehyde worked out by the authors in 1957-58 proved to be more convenient than the methods described previously (Refs 8-11). Contrary to the assertions of reference 11, ethereal solutions of ferrocenaldehyde yield a bisulfite compound. This was utilized in the authors' method. Ferricinium cation developed in the reaction, and the ring was decomposed. The aldehyde was used to prepare several dyestuffs. Finally, the authors describe their experiments Nrs 1-5. There are 1

Some Observations Concerning the Chemistry of Ferrocene SOV/20-130-2-27/69

references. 3 of which are Soviet

ASSOCIATION: Gosudarstvennyy nauchno issledovatel'skiy institut organicheskikh poluproduktov i krasiteley im. K. Ye. Voroshilova (State Scientific Research Institute of Organic Intermediates and Dyestuffs imeni K. Ye. Voroshilov)

PRESENTED: September 11, 1959, by A. N. Nesmeyanov, Academician

SUBMITTED: September 5, 1959

Card 4/4

L 24516-66 EWT(m)/EWP(j)/T IJP(c) RM

ACC NR: AP6009525 (A) SOURCE CODE: UR/0413/66/000/005/0049/0049

AUTHOR: Laptev, N. G.; Shemtova, M. R.; Tabachnikova, N. I.; Klimova, T. S.

23
B

ORG: none

TITLE: Preparation of light-resistant, migration-resistant, and heat-resistant varnishes. [Class 22, No. 178404 announced by the Scientific-Research Institute for Organic Semifinished Products and Dyes (Nauchno-issledovatel'skiy institut organicheskikh poluproduktov i krasiteley)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 5, 1966, 49

TOPIC TAGS: varnish, heat resistant varnish, light resistant varnish, migration resistant varnish

ABSTRACT: An Author Certificate has been issued describing a method for obtaining light-resistant, migration-resistant, and heat-resistant varnishes made with sulfonated linear quinacridone. To produce varnishes suitable for coating plastics, rubber, and film-forming compounds, the sulfonated linear quinacridone, either in the form of a water solution of the free acid or in the form of a water-soluble

2

Card 1/2 UDC: 667.636.44/46

L 24516-66
ACC NR: AP6009525 O

salt is treated with the water solution of one of the salts of the first, third, and eighth metal group, whereby the process is conducted in the presence of dispersion agents. [LD]

SUB CODE: 11/ SUBM DATE: 05Jan65/

Card 2/2 BLG

BUCHACHER, Ye.A.; NEYAGLOV, A.V.; POKHODENKO, N.T.; SHEMYAKIN, A.A.

Improved bydraulic systems for the double end packing of centrifugal pumps. Mash. i neft. obor. no.4:7-10 '64. (MIRA 17:6)

1. Bashkirskiy nauchno-issledovatel'skiy institut po p ererabotke nefti.

BUCHACHER, Ye.A., NEYAGLOV, A.V.; POKHODENKO, N.T.; SHEMYAKIN, A.A.

Hydraulic systems of double end packing for centrifugal pumps. Trudy BashNII NP no.7:62-67 '64. (MIRA 17:9)

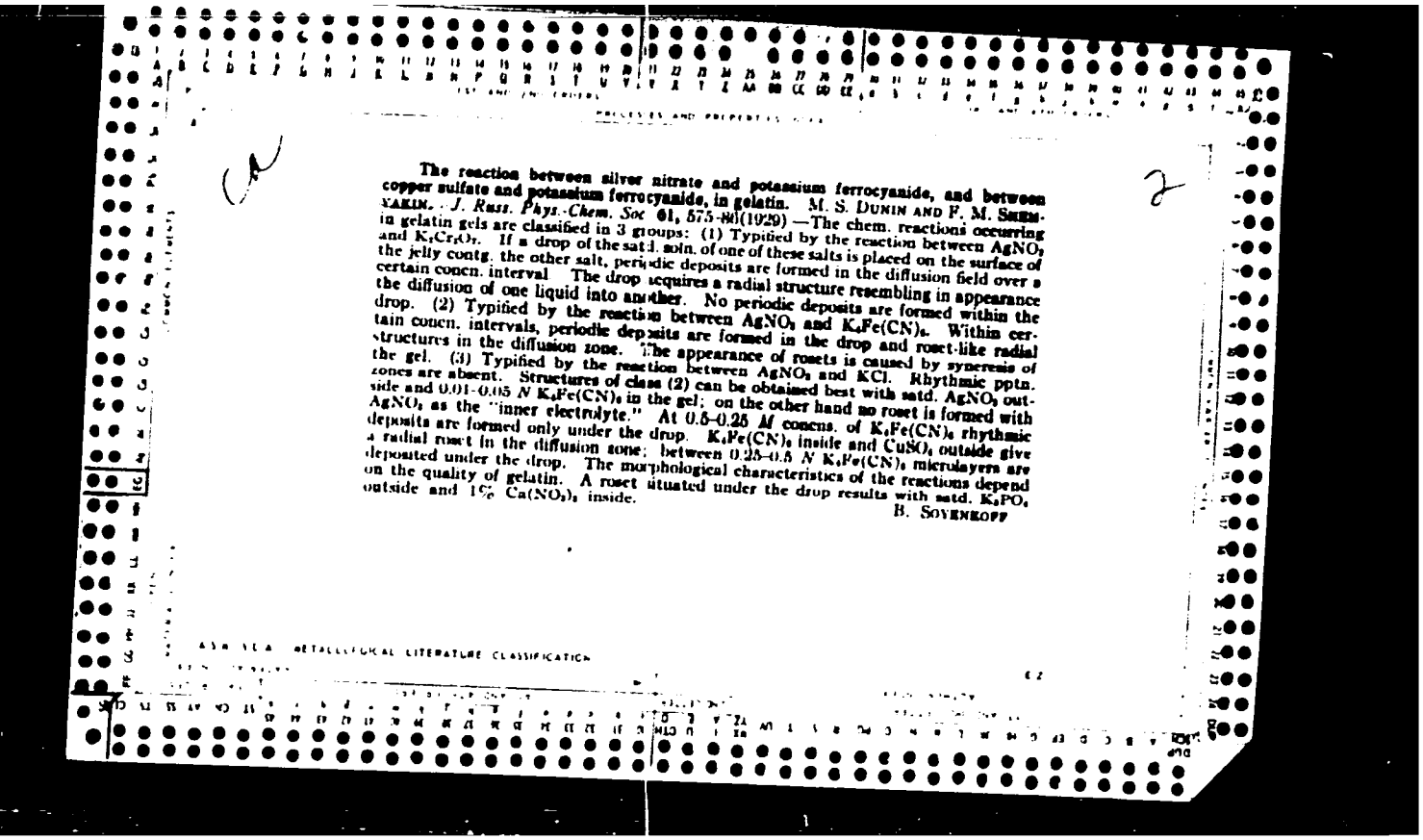
LADYGINA-KOTS, Nadezhda Nikolayevna; KAGANOV, V.M., otv.red.; SHEMYAKIN, F.I., otv.red.; ROGINSKIY, Ya.Ya., otv.red.; GELLERSHTEYN, S.G., red.izd-va; SHEVCHENKO, G.N., tekhn.red.

[Constructive and implement-using behavior in higher apes (chimpanzees)] Konstruktivnaia i orudiinaia deiatel'nost' vysshikh obez'ian (shimpanze). Moskva, Izd-vo Akad.nauk SSSR, 1959. 398 p. (MIRA 13:1)
(Chimpanzees) (Animal intelligence)

[redacted]

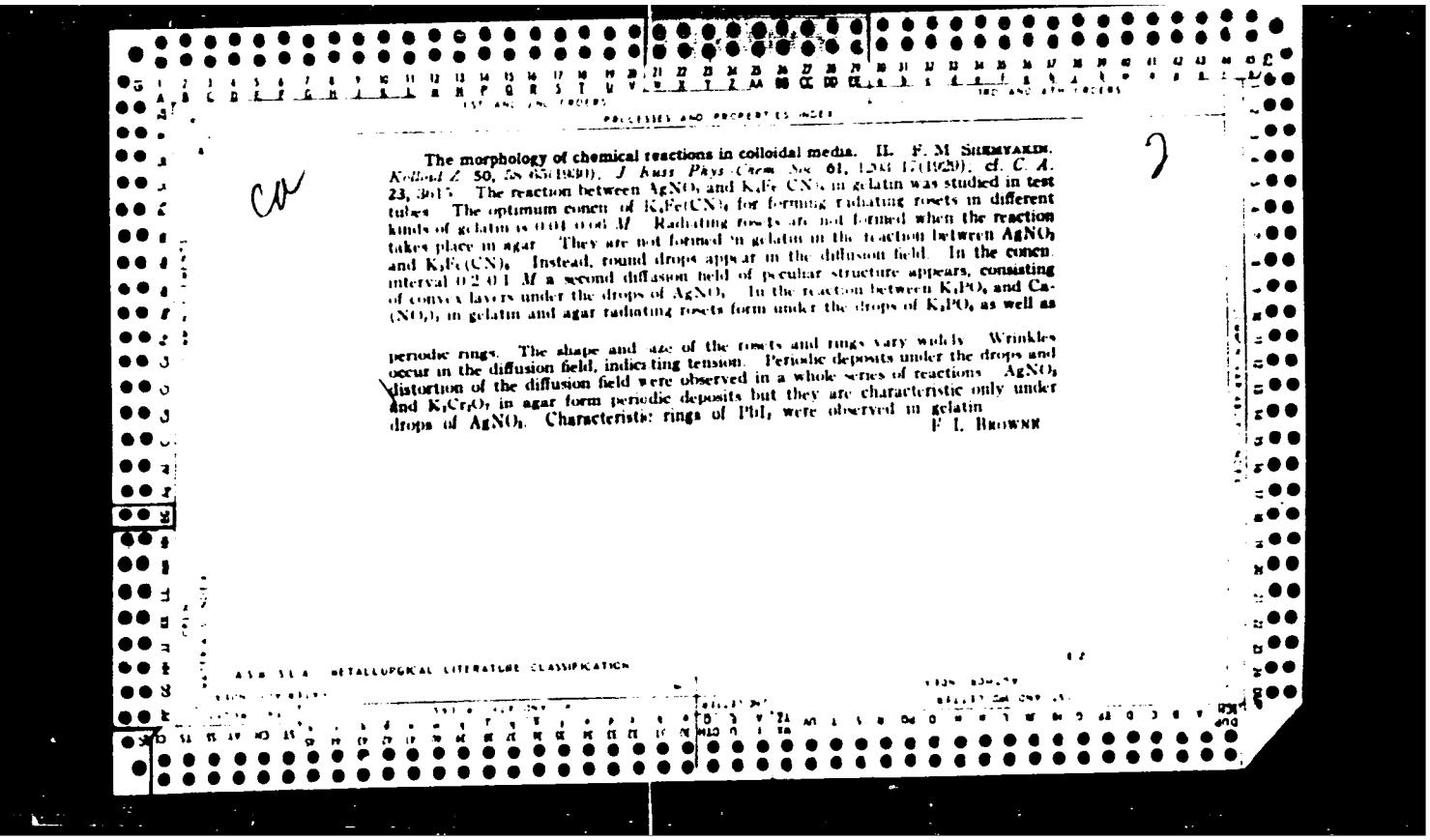
CHERNYSHIN, B.N., kand. tekhn. nauk

Safety measures in a high-speed section. Put' i put. khoz. 8 no. 2:22 '63. (MIRA 17:10)



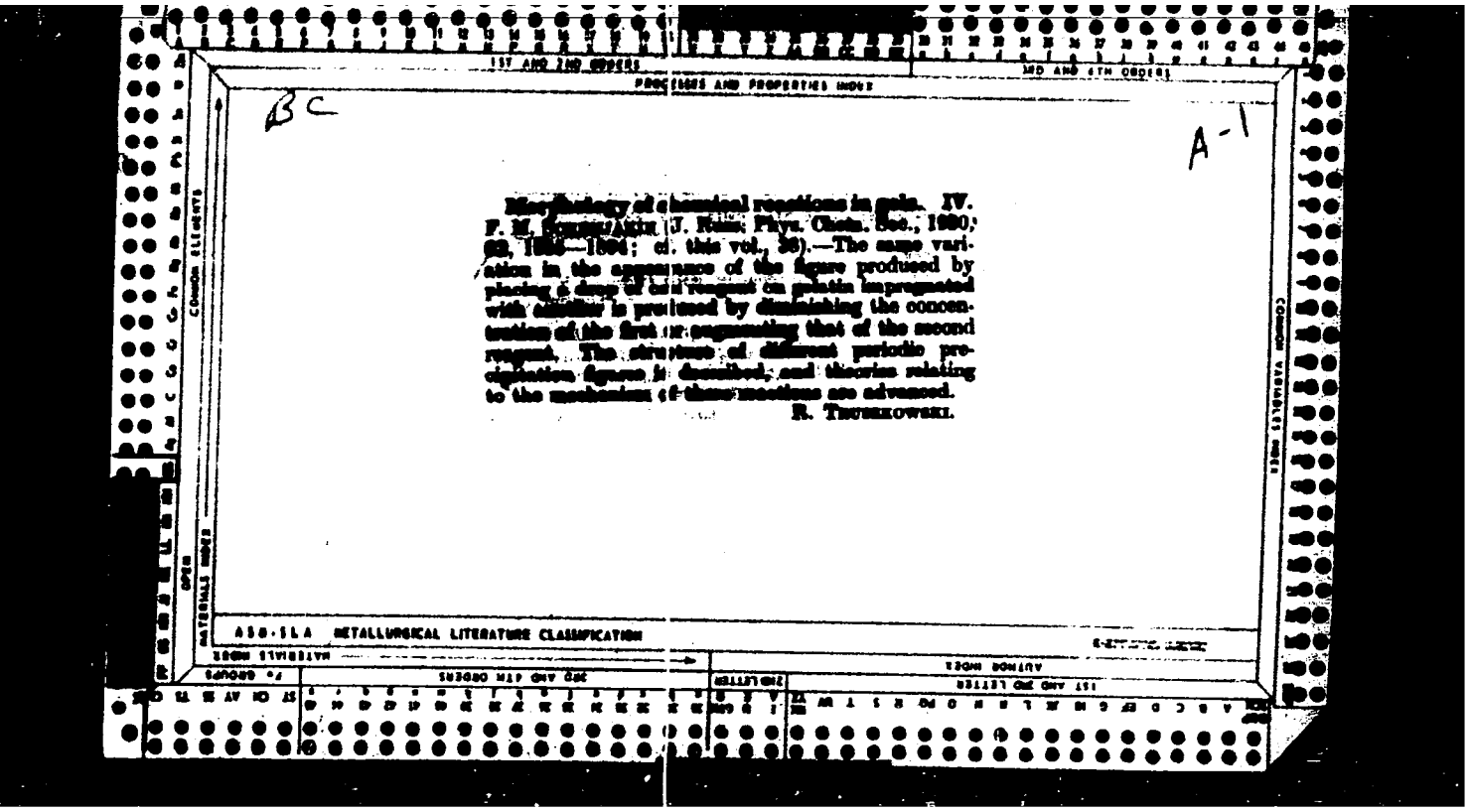
The reaction between silver nitrate and potassium ferrocyanide, and between copper sulfate and potassium ferrocyanide, in gelatin. M. S. DUNIN AND P. M. SAMSAKIN. *J. Russ. Phys.-Chem. Soc* **61**, 575-86(1929).—The chem. reactions occurring in gelatin gels are classified in 3 groups: (1) Typified by the reaction between $AgNO_3$ and $K_2Cr_2O_7$. If a drop of the satd. soln. of one of these salts is placed on the surface of the jelly contg. the other salt, periodic deposits are formed in the diffusion field over a certain concn. interval. The drop acquires a radial structure resembling in appearance the diffusion of one liquid into another. No periodic deposits are formed within the drop. (2) Typified by the reaction between $AgNO_3$ and $K_4Fe(CN)_6$. Within certain concn. intervals, periodic deposits are formed in the drop and roset-like radial structures in the diffusion zone. The appearance of rosets is caused by syneresis of the gel. (3) Typified by the reaction between $AgNO_3$ and KCl. Rhythmic pptn. zones are absent. Structures of class (2) can be obtained best with satd. $AgNO_3$ outside and 0.01–0.05 *N* $K_4Fe(CN)_6$ in the gel; on the other hand no roset is formed with $AgNO_3$ as the "inner electrolyte." At 0.5–0.25 *M* concns. of $K_4Fe(CN)_6$ rhythmic deposits are formed only under the drop. $K_4Fe(CN)_6$ inside and $CuSO_4$ outside give a radial roset in the diffusion zone; between 0.25–0.5 *N* $K_4Fe(CN)_6$ microlayers are deposited under the drop. The morphological characteristics of the reactions depend on the quality of gelatin. A roset situated under the drop results with satd. K_3PO_4 outside and 1% $Ca(NO_3)_2$ inside.

B. SOVENKOFF



The morphology of chemical reactions in colloidal media. II. F. M Shemyakin. *Kolloid Z* 50, 58 (1930). *J Russ Phys-Chem Soc* 61, 1243-17(1929). cf. *C. A.* 23, 3015. The reaction between $AgNO_3$ and $K_4Fe(CN)_6$ in gelatin was studied in test tubes. The optimum concn of $K_4Fe(CN)_6$ for forming radiating rosets in different kinds of gelatin is 0.01 or 0.1 *M*. Radiating rosets are not formed when the reaction takes place in agar. They are not formed in gelatin in the reaction between $AgNO_3$ and $K_4Fe(CN)_6$. Instead, round drops appear in the diffusion field. In the concn. interval 0.2-0.1 *M* a second diffusion field of peculiar structure appears, consisting of convex layers under the drops of $AgNO_3$. In the reaction between K_3PO_4 and $Ca(NO_3)_2$ in gelatin and agar radiating rosets form under the drops of K_3PO_4 as well as periodic rings. The shape and size of the rosets and rings vary widely. Wrinkles occur in the diffusion field, indicating tension. Periodic deposits under the drops and distortion of the diffusion field were observed in a whole series of reactions. $AgNO_3$ and $K_2Cr_2O_7$ in agar form periodic deposits but they are characteristic only under drops of $AgNO_3$. Characteristic rings of PbI$_2$ were observed in gelatin.

F. I. Browne



BC

A-1

Microbiology of chemical reactions in gels. IV. F. M. [illegible]/Akin. J. Russ. Phys. Chem. Soc., 1930; 62, 1885—1896; cf. this vol., 36).—The same variation in the appearance of the figure produced by placing a drop of one reagent on gelatin impregnated with another is produced by diminishing the concentration of the first (or augmenting that of the second reagent). The structure of different periodic precipitation figures is described, and theories relating to the mechanism of these reactions are advanced.

R. Truszkowski.

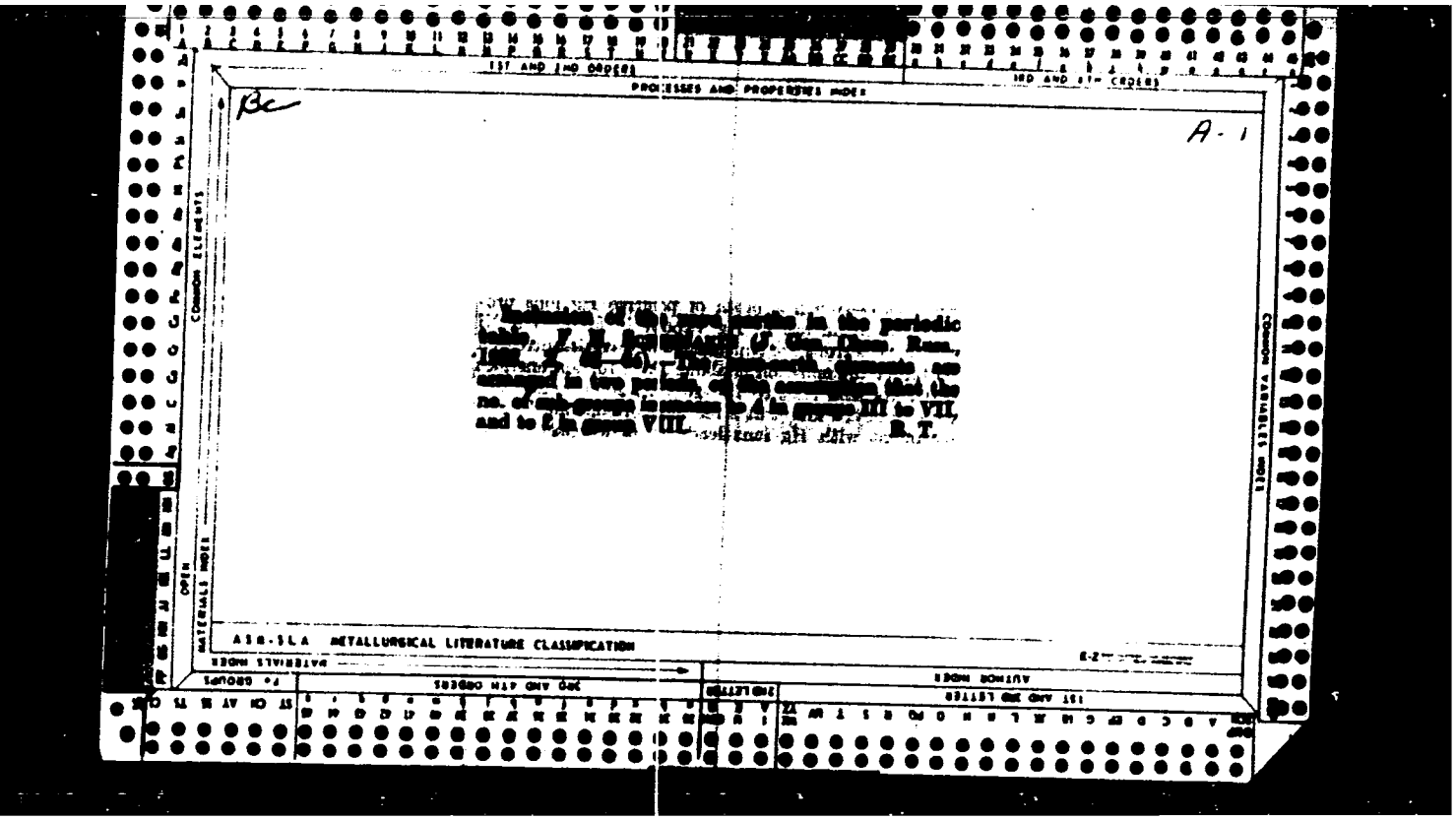
A 50-51 METALLURGICAL LITERATURE CLASSIFICATION

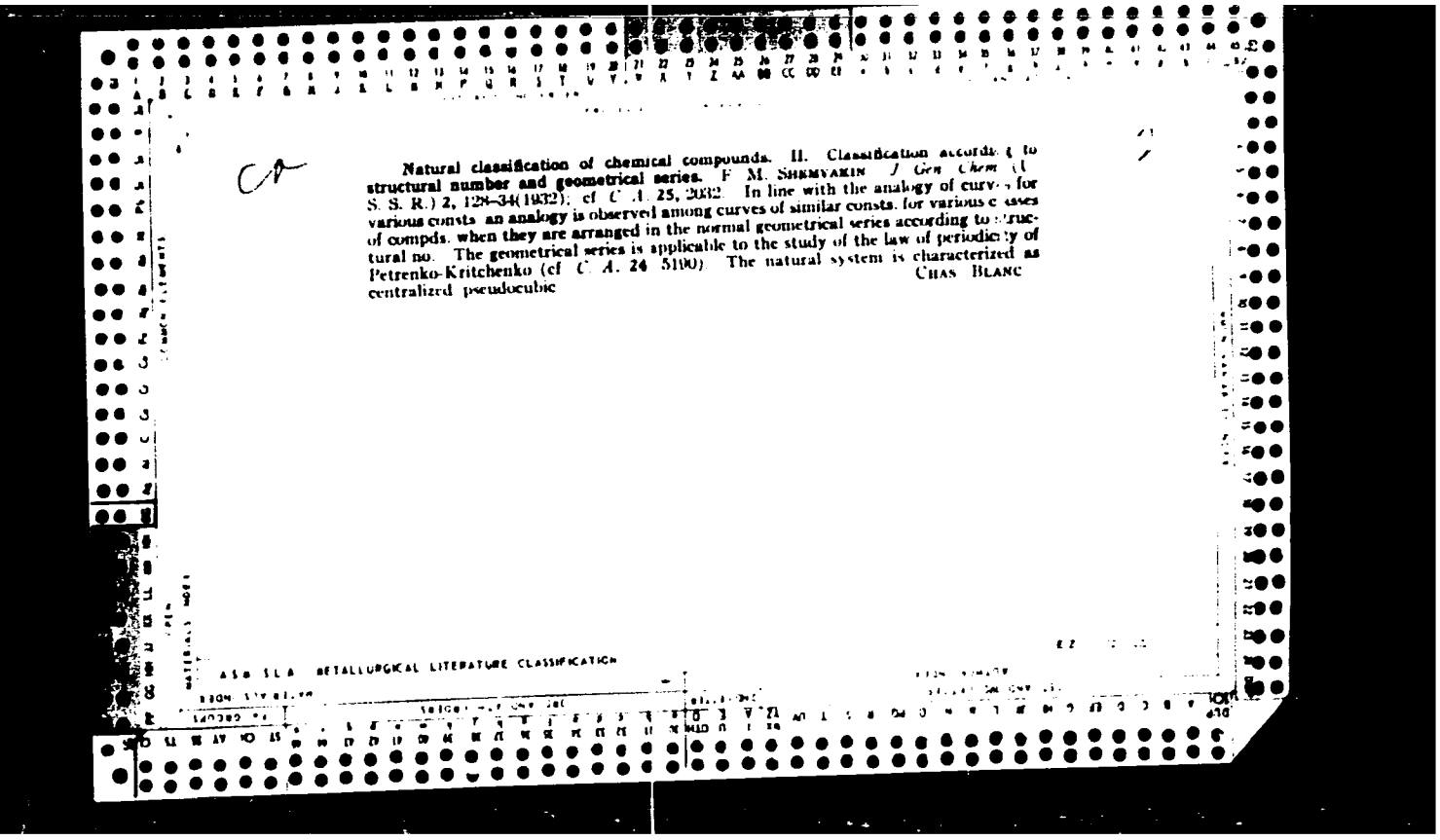
CA

2

Morphology of chemical reactions in gels. V. The theory of periodic reactions.
F. M. Shemyakin. *J. Gen. Chem.* (U. S. S. R.) 1, 455-9 (1931). cf. C. A. 25, 3801-2. A drop of liquid possesses orientation planes and other evidences of internal structure. It can therefore be regarded as a "unit of higher order" compared with the mol. The structures (rosets, etc.) formed when a drop of satd. soln. is placed on a jelly probably reproduce the arrangement of the mols. inside the drop. Within a drop of $AgNO_3$ soln., for instance, oppositely charged (radial or concentric) zones possibly exist, some contg. complex cations $[Ag(H_2O)_2]^+$, others the anions $[Ag(NO_3)_2]^-$. When the drop increases by absorbing water from the jelly, either the radial zones becomes longer or new concentric zones are formed. In the latter case, the zones formed alternate in sign, the changes in the surface charge on the drop produce changes in the angle of contact liquid-gel. The drop should therefore spread in a discontinuous (stepwise) fashion, as is well borne out by the expt. The penetration of the drop into the jelly is often accompanied by change in the type of structure, for instance, from radial to zonal in the case of $AgNO_3$ diffusing into $K_2Cr_2O_7$ in gelatin. The alternately charged zones remain when the solute in the drop diffuses into the jelly. As a result, the particles of the ppt. formed alternate in charge during the diffusion. Observations of the diffusion of $AgNO_3$ into gelatin jelly contg. $K_2Cr_2O_7$ and changes in the structures, produced when drops of a satd. soln. (of $K_4Fe(CN)_6$, $K_2Cr_2O_7$, $FeSO_4$) are added, support the above views.

B. Sovinskoye

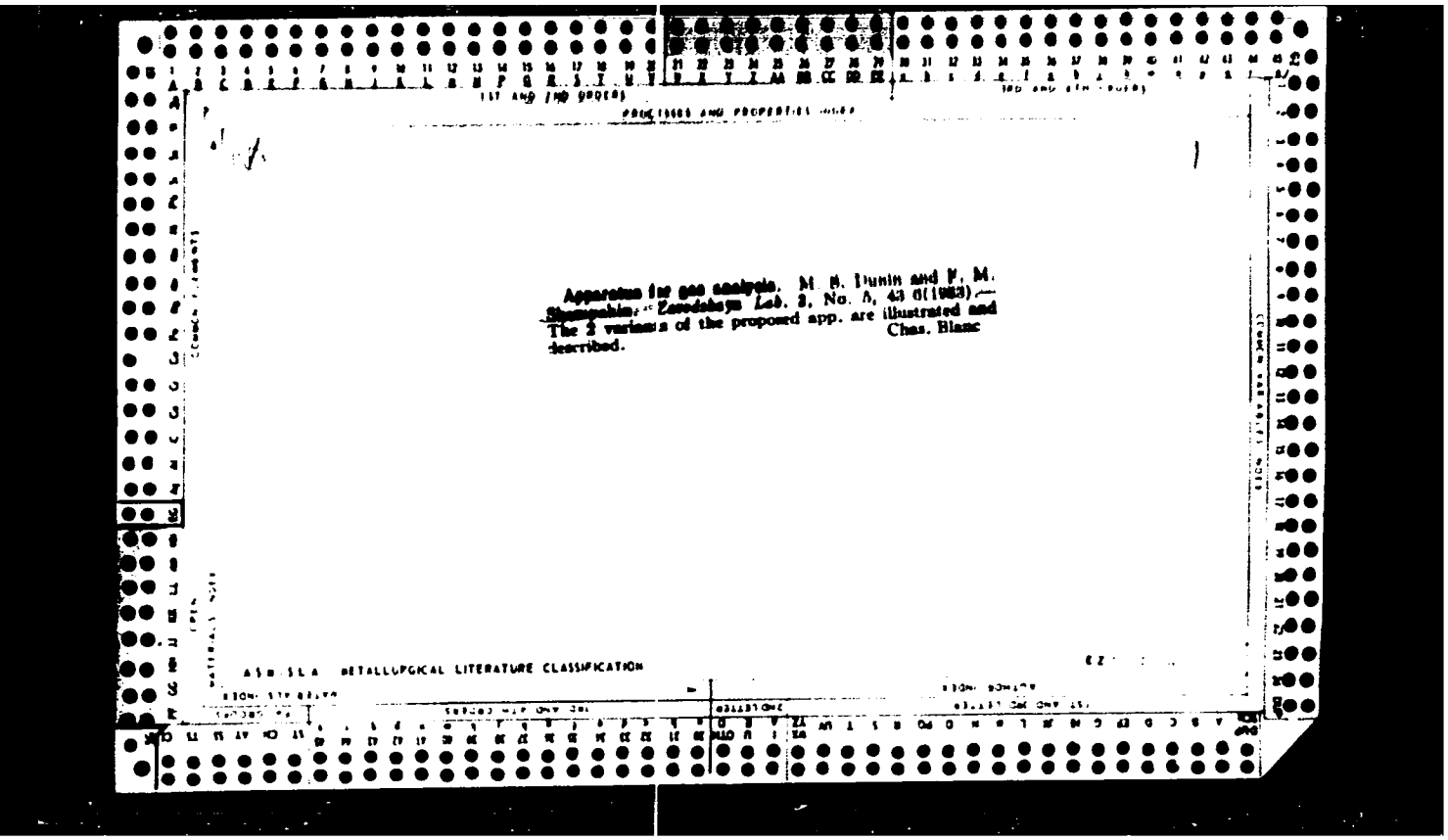




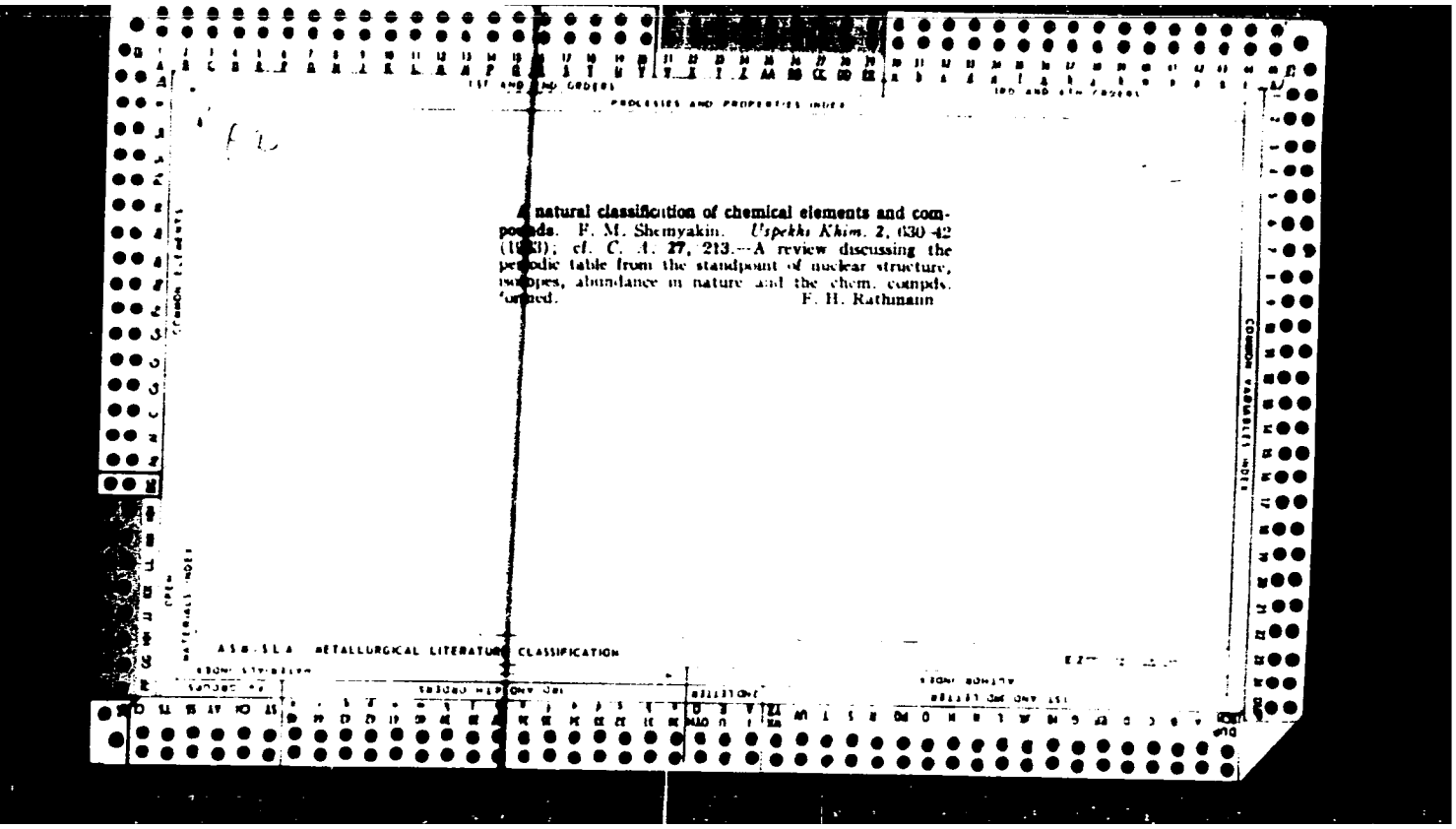
Natural classification of chemical compounds. II. Classification according to structural number and geometrical series. F. M. SHEMYAKIN *J. Gen. Chem.* (U. S. S. R.) 2, 128–34 (1932); cf. *C. A.* 25, 2032. In line with the analogy of curves for various consts. an analogy is observed among curves of similar consts. for various classes of compds. when they are arranged in the normal geometrical series according to structural no. The geometrical series is applicable to the study of the law of periodicity of Petrenko-Kritchenko (cf. *C. A.* 24, 5100). The natural system is characterized as centralized pseudocubic

CHAS. BLANC

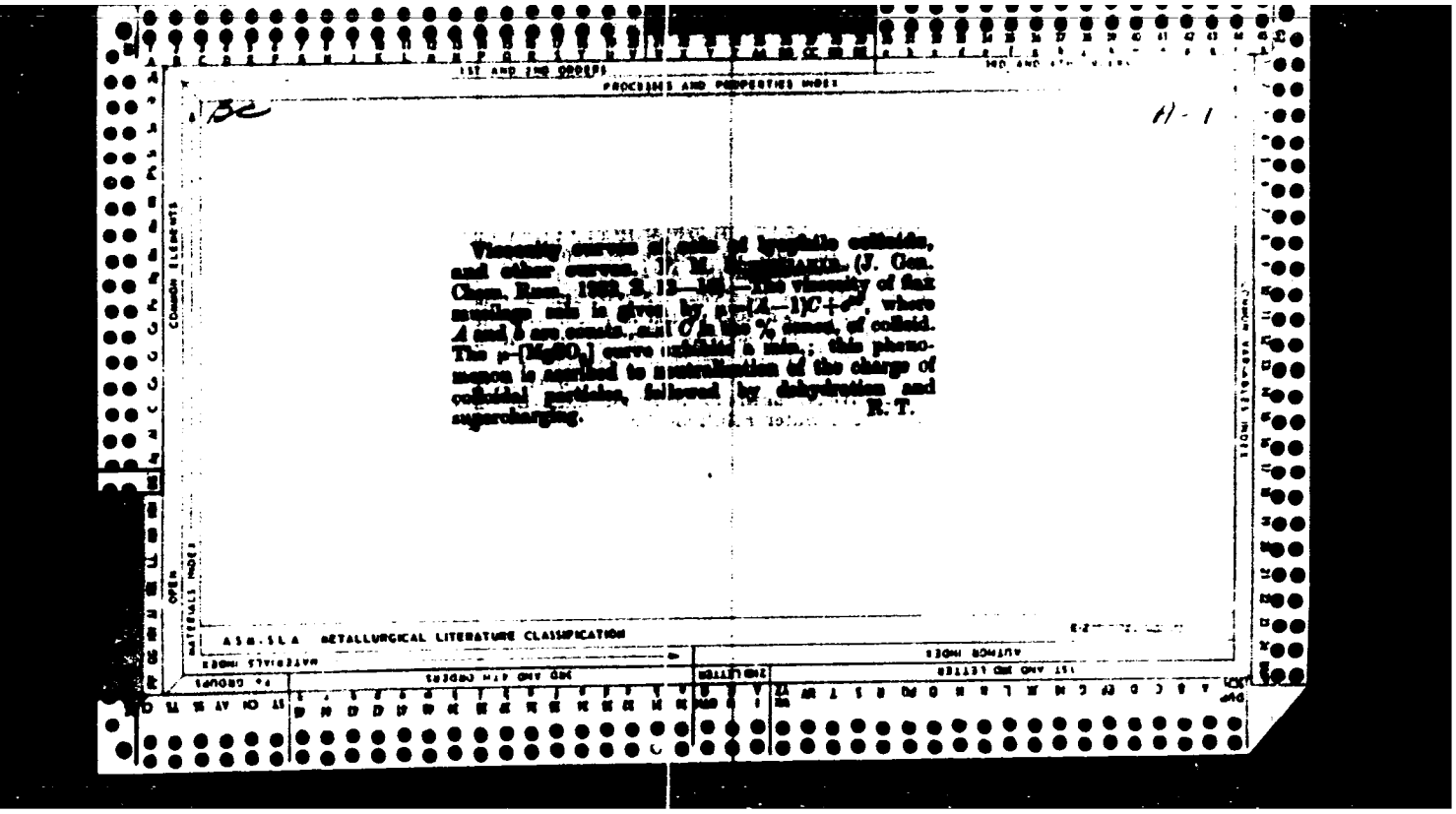
ASTIA METALLURGICAL LITERATURE CLASSIFICATION



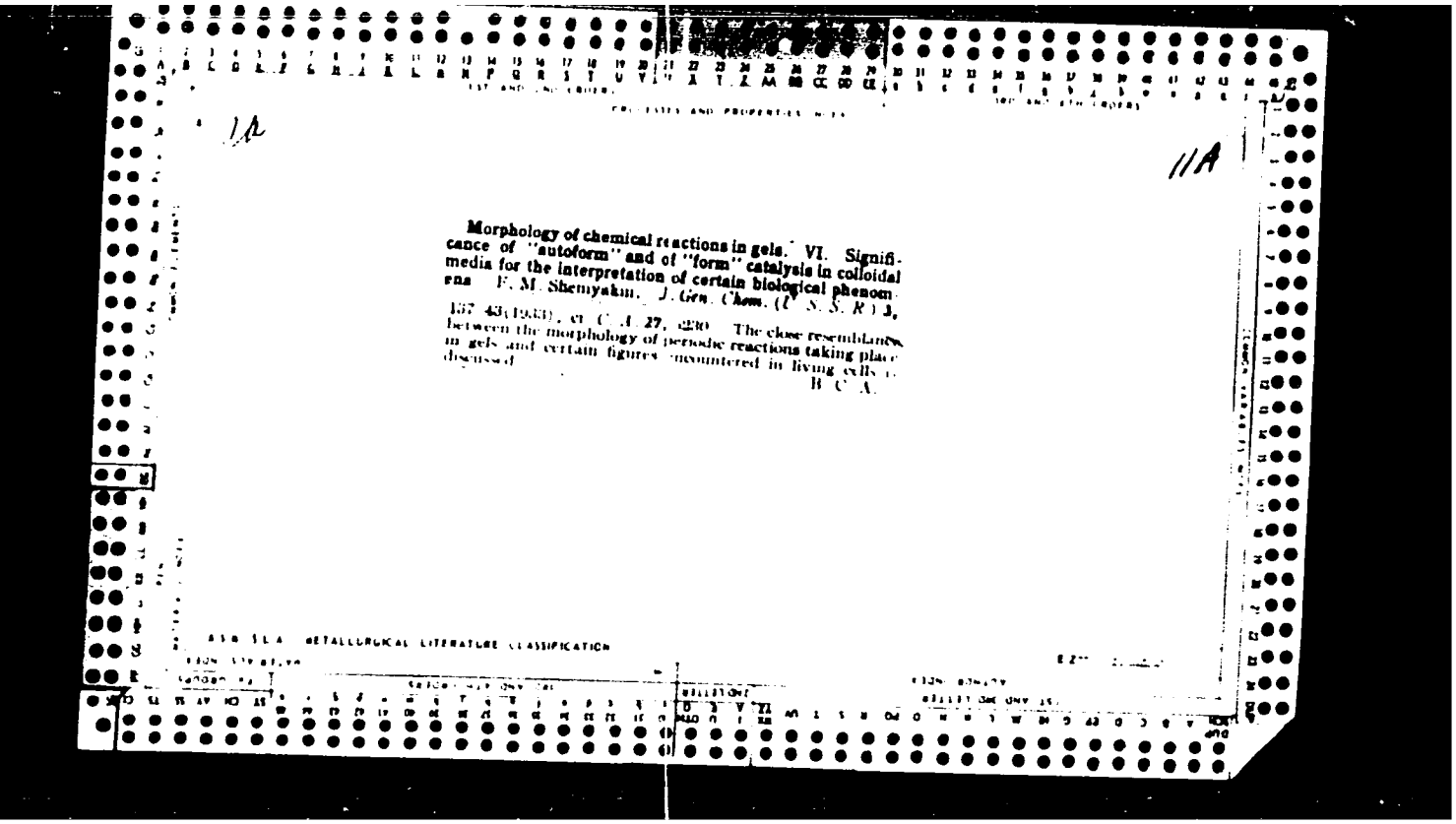
Apparatus for gas analysis. M. A. Ilunin and P. M. Shumpushin. Zavodskaya Lab. 3, No. 4, 43 6(1963). The 2 variants of the proposed app. are illustrated and described. Chas. Blanc



A natural classification of chemical elements and compounds. F. M. Shemyakin. *Uspekhi Khim.* 2, 630-42 (1933); cf. *C. A.* **27**, 213.—A review discussing the periodic table from the standpoint of nuclear structure, isotopes, abundance in nature and the chem. compds. formed. F. H. Rathmann



Viscosity curves of soln. of lyophilic colloids, and other curves. J. M. [illegible] (J. Gen. Chem., Russ., 1938, 8, 13—16).—The viscosity of fair sensitive sols is given by $\eta = (A-1)C+\beta$, where A and β are constants, and C is the % content of colloid. The η–[MgSO$_4$] curve exhibits a min.; this phenomenon is ascribed to neutralisation of the charge of colloidal particles, followed by dehydration and superchanging. R. T.



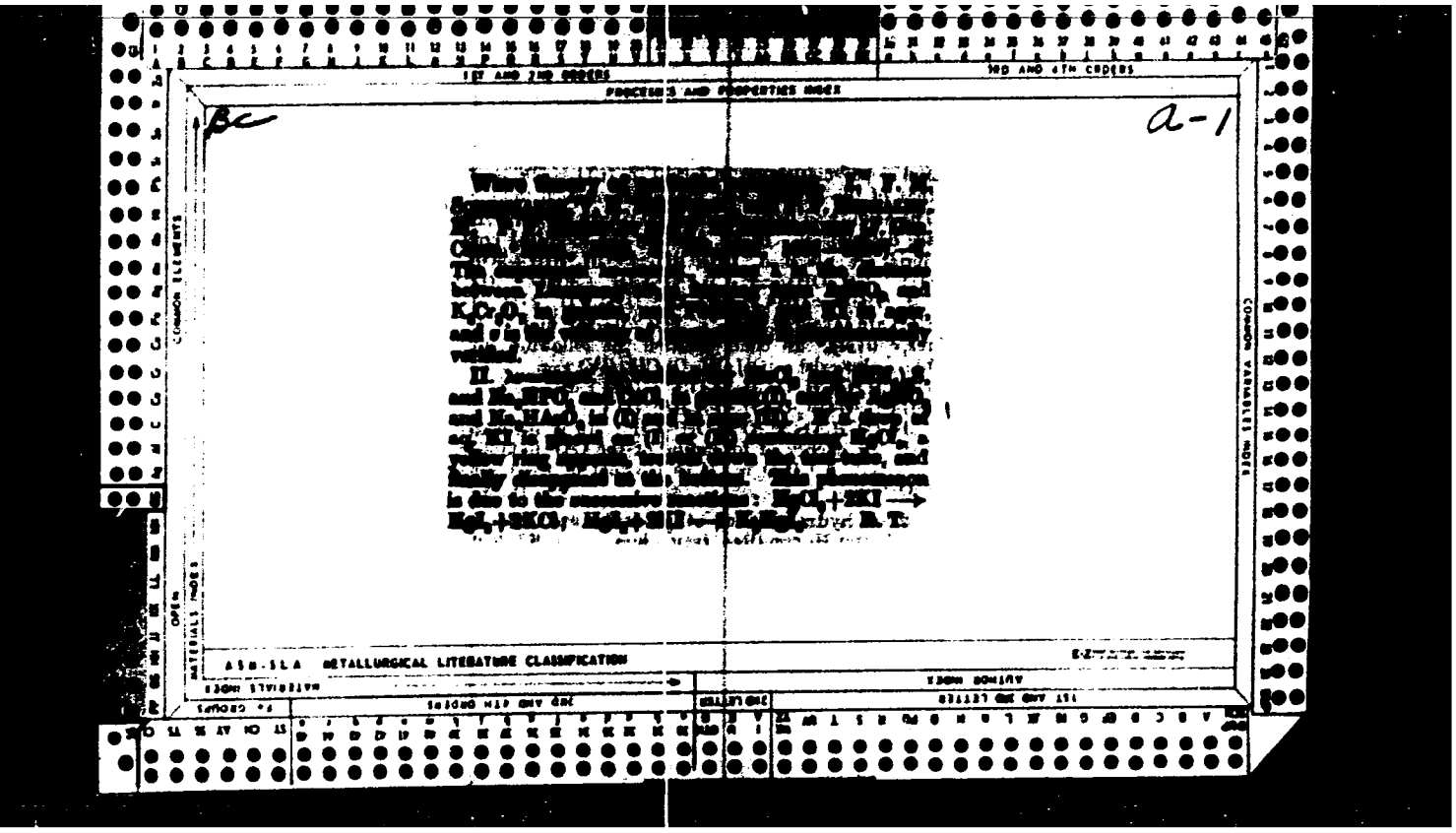
IIA

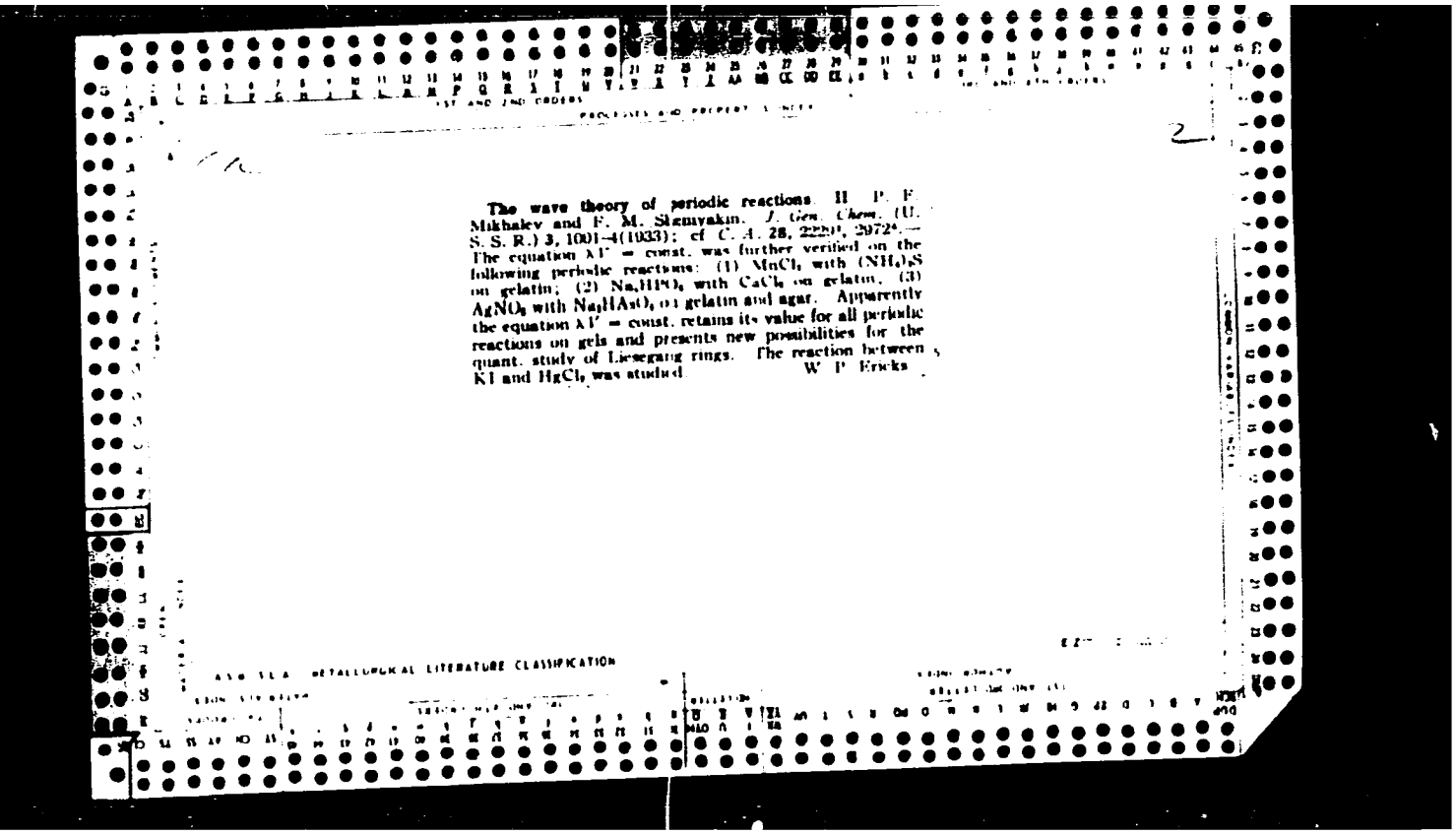
Morphology of chemical reactions in gels. VI. Significance of "autoform" and of "form" catalysis in colloidal media for the interpretation of certain biological phenomena. F. M. Shemyakin. *J. Gen. Chem. (U. S. S. R.)* 3, 137-43(1933); cf. *C. A.* 27, 4280. The close resemblance between the morphology of periodic reactions taking place in gels and certain figures encountered in living cells is discussed.

B. C. A.

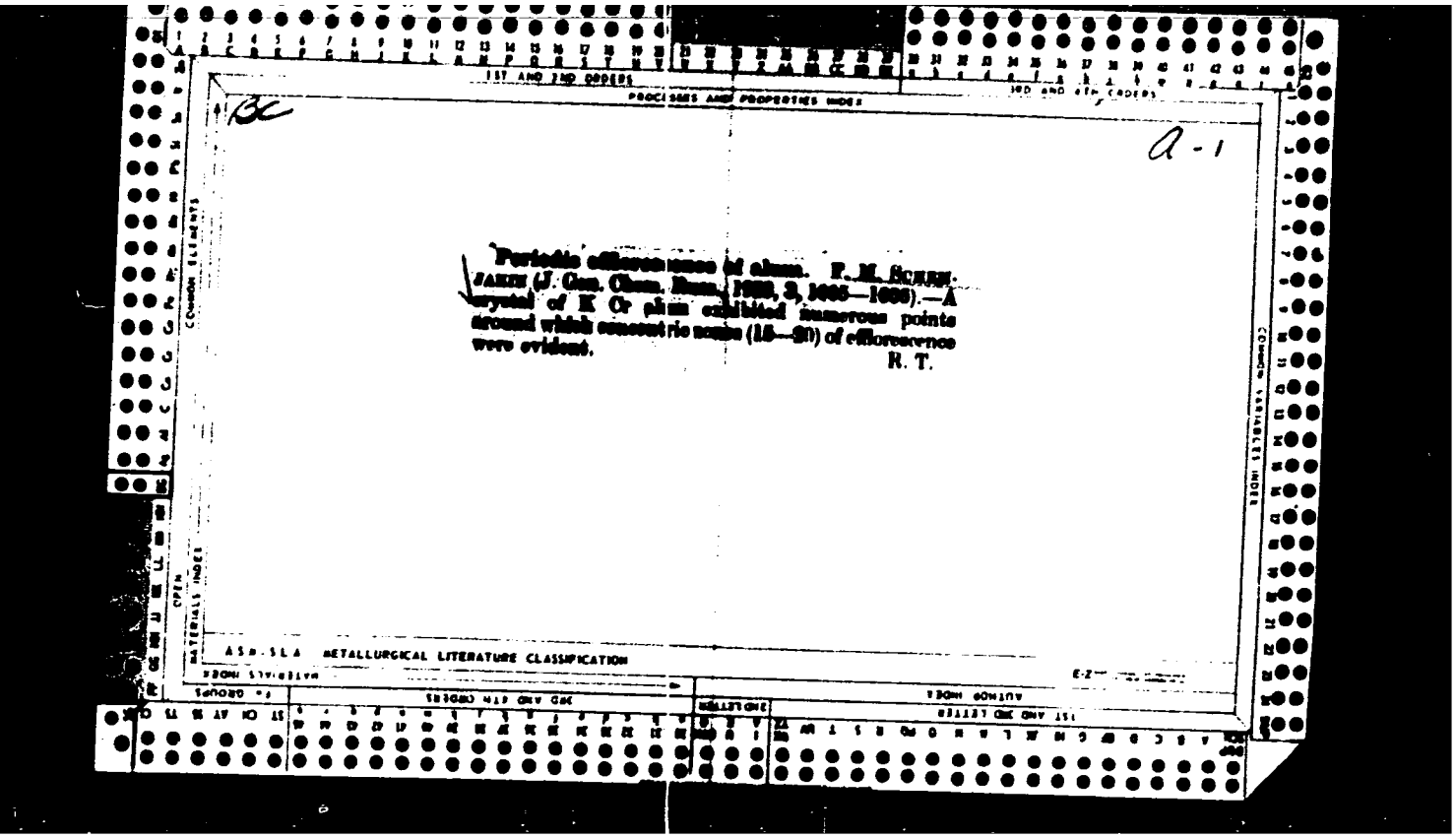
Natural classification of chemical compounds. III. P. M. Shemyakin, *J. Gen. Chem.* (U. S. S. R.) 3, 260-78 (1933); cf. C. A. 27, 213.—The mol. system is qualitatively different from the at. system. The natural mol. system can be characterized as a generalized diagram of properties built according to the mol. and structural no. and the mol. symmetry. For the zero group of the Mendeleev system the conceptions of mol. and at. no. are equiv. According to the like or unlike mol. no. and symmetry there are constructed 3 basic kinds of tables, each subdivided into 3 groups. Thus are obtained the tables of 9 kinds genetically connected by "the law of centralised cults." In the normal geometrical series each mol. can be designated by a symbol detg. the interrelation of its nodal points. Comparison of the mols. in the system leads to conclusions and predictions regarding their phys. and chem. properties. The phys. consts. of mols. are basically detd. by the type of the inactive gas to which the given mol. belongs, its symmetry, the no. of atoms, the law of periodicity, the interrelation of the magnitudes of its component parts, and the no. and structure of the nodal points.

Chas. Blanc





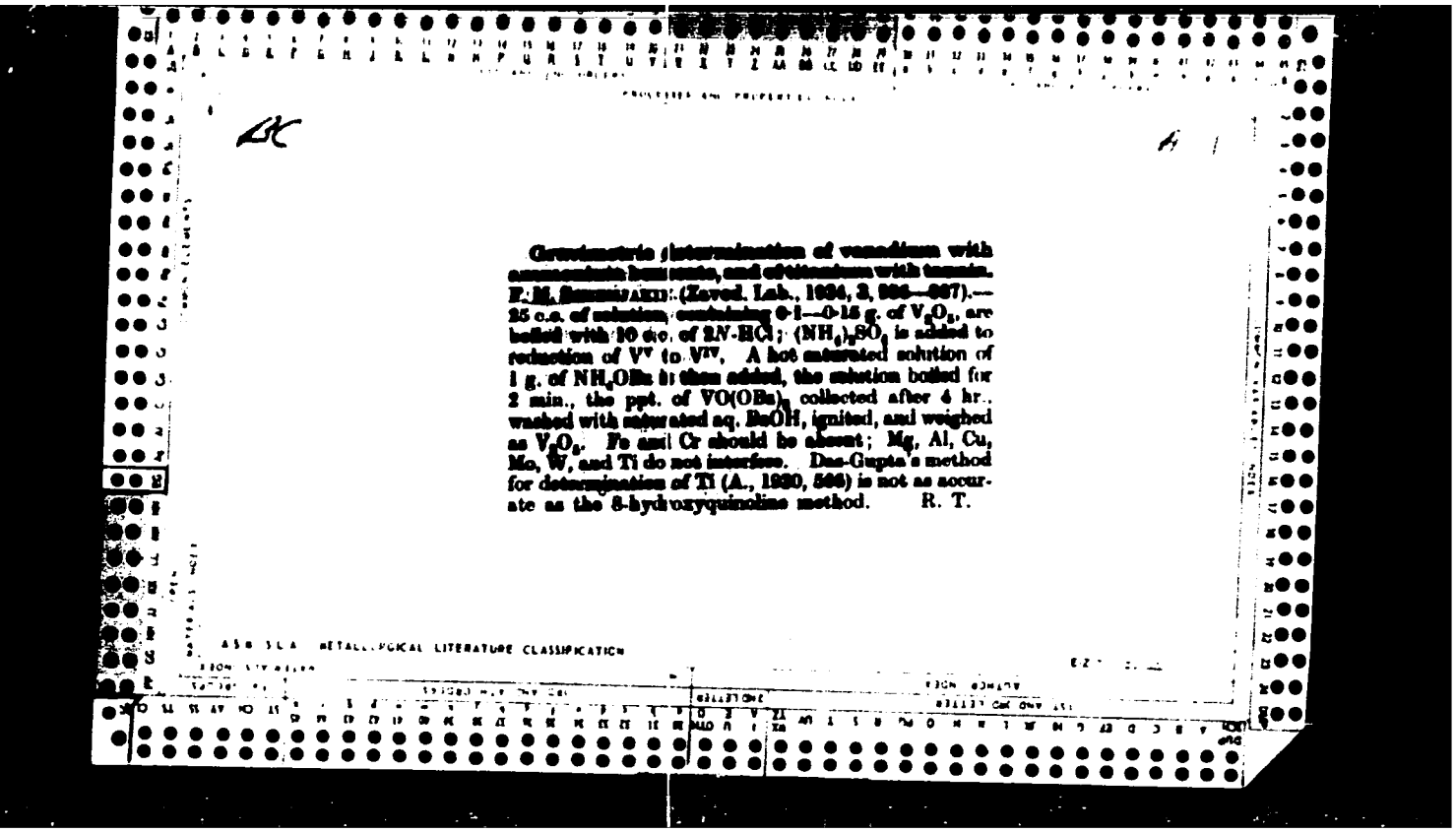
The wave theory of periodic reactions. II. P. F. Mikhalev and F. M. Shemyakin. *J. Gen. Chem.* (U. S. S. R.) 3, 1001–4(1933); cf. *C. A.* 28, 2220⁹, 2972⁴.—The equation $AV = const.$ was further verified on the following periodic reactions: (1) $MnCl_2$ with $(NH_4)_2S$ on gelatin; (2) Na_2HPO_4 with $CaCl_2$ on gelatin. (3) $AgNO_3$ with Na_2HAsO_4 on gelatin and agar. Apparently the equation $AV = const.$ retains its value for all periodic reactions on gels and presents new possibilities for the quant. study of Liesegang rings. The reaction between KI and $HgCl_2$ was studied. W. P. Ericks



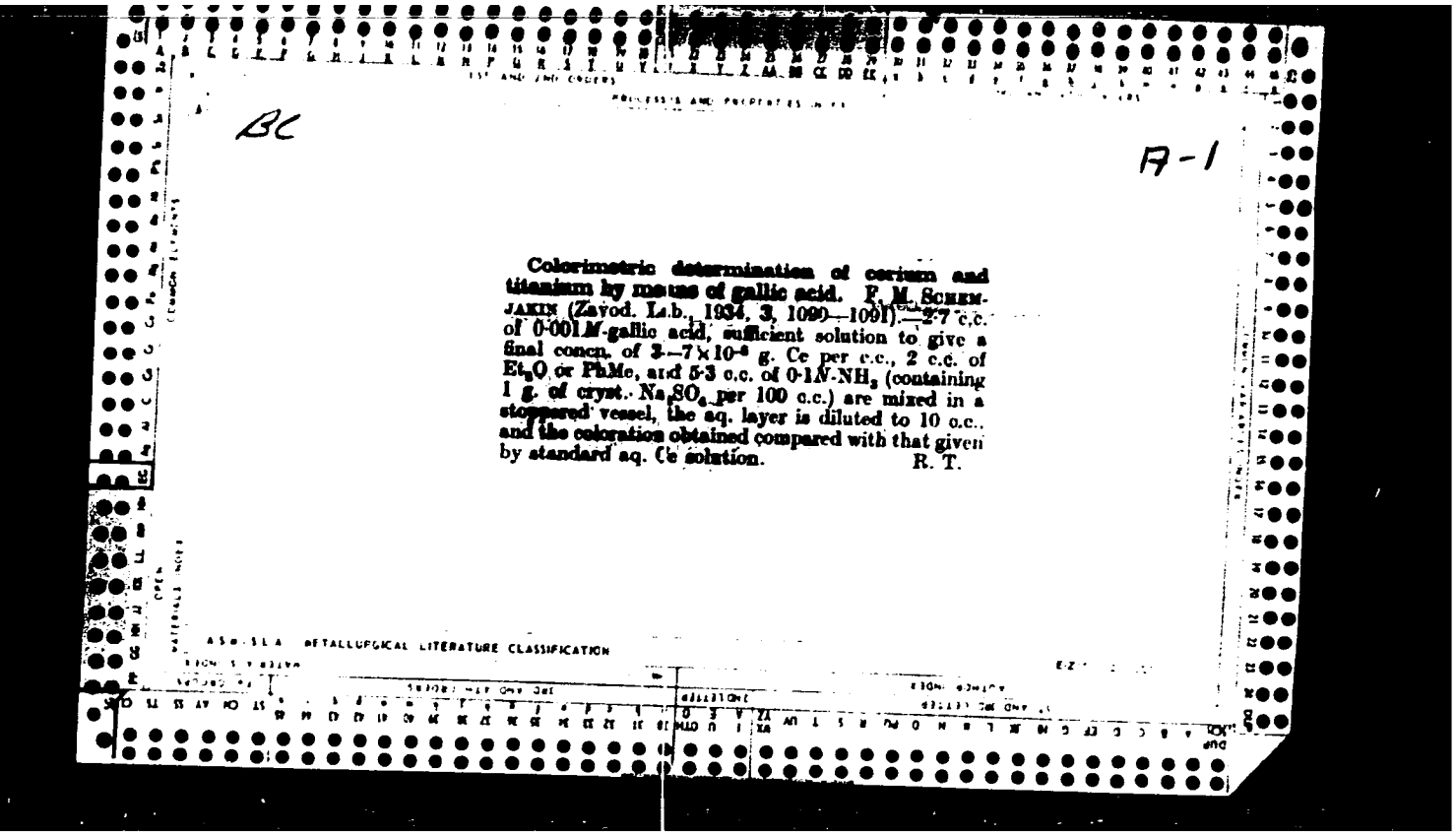
Periodic efflorescences of alums. F. M. Jaeger. (J. Gen. Chem. Russ., 1938, 8, 1605—1606).—A crystal of K Cr alum exhibited numerous points around which concentric zones (15—20) of efflorescence were evident.

R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Gravimetric determination of vanadium with ammonium benzoate, and of titanium with tannin. F. M. Shemyakin and N. I. Zaitseva (Zavod. Lab., 1934, 3, 926—937).—25 c.c. of solution, containing 0·1—0·15 g. of V_2O_5, are boiled with 10 c.c. of 2*N*-HCl; $(NH_4)_2SO_3$ is added to reduction of V^V to V^{IV}. A hot saturated solution of 1 g. of NH_4OBz is then added, the solution boiled for 2 min., the ppt. of $VO(OBz)_2$ collected after 4 hr., washed with saturated aq. BzOH, ignited, and weighed as V_2O_5. Fe and Cr should be absent; Mg, Al, Cu, Mo, W, and Ti do not interfere. Das-Gupta's method for determination of Ti (A., 1930, 566) is not as accurate as the 8-hydroxyquinoline method. R. T.

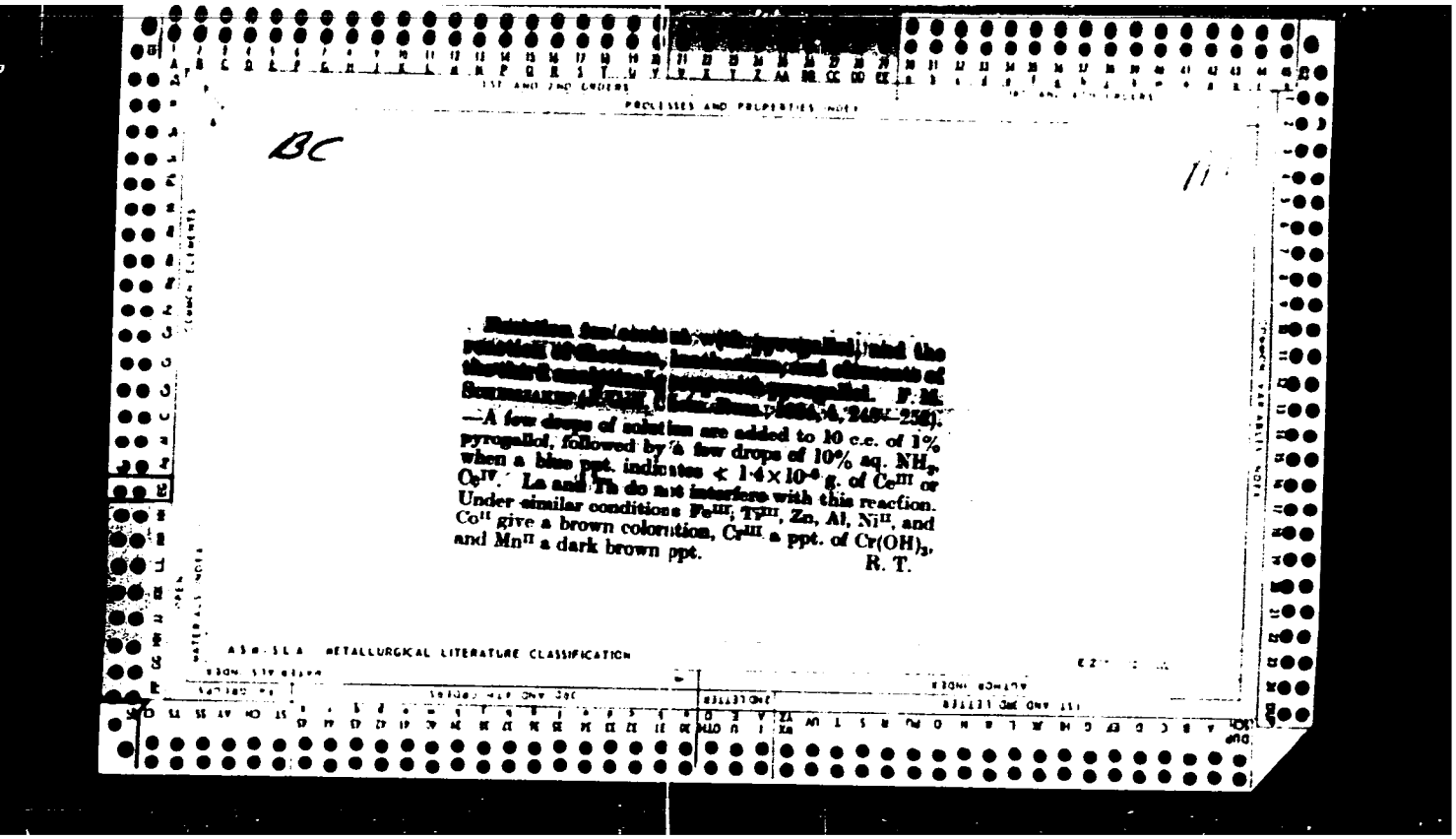


BC

A-1

Colorimetric determination of cerium and titanium by means of gallic acid. F. M. SCHEMJAKIN (Zavod. Lab., 1934, 3, 1090—1091).—2·7 c.c. of 0·001*M*-gallic acid, sufficient solution to give a final concn. of 3—7×10⁻⁶ g. Ce per c.c., 2 c.c. of Et_2O or PhMe, and 5·3 c.c. of 0·1*N*-NH_3 (containing 1 g. of cryst. Na_2SO_4 per 100 c.c.) are mixed in a stoppered vessel, the aq. layer is diluted to 10 c.c., and the coloration obtained compared with that given by standard aq. Ce solution. R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



BC

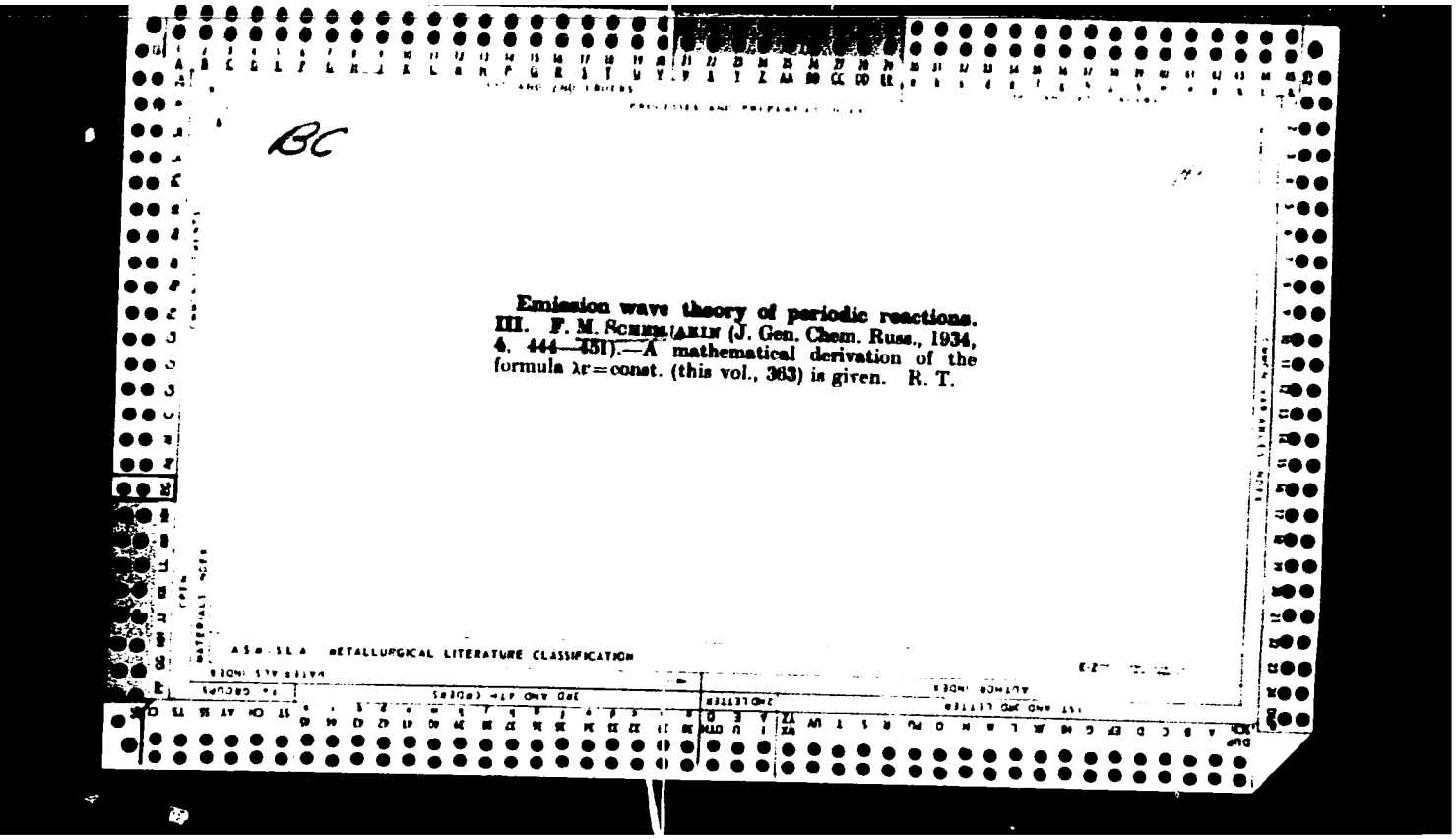
11

[redacted] pyrogallol, [redacted] the [redacted] [redacted] [redacted] pyrogallol. F. M. [redacted] 1956, 6, 248–258).

—A few drops of solution are added to 10 c.c. of 1% pyrogallol, followed by a few drops of 10% aq. NH_3, when a blue ppt. indicates $< 1{\cdot}4 \times 10^{-6}$ g. of Ce^{III} or Ce^{IV}. La and Th do not interfere with this reaction. Under similar conditions Fe^{III}, Ti^{III}, Zn, Al, Ni^{II}, and Co^{II} give a brown coloration, Cr^{III} a ppt. of $Cr(OH)_3$, and Mn^{II} a dark brown ppt.

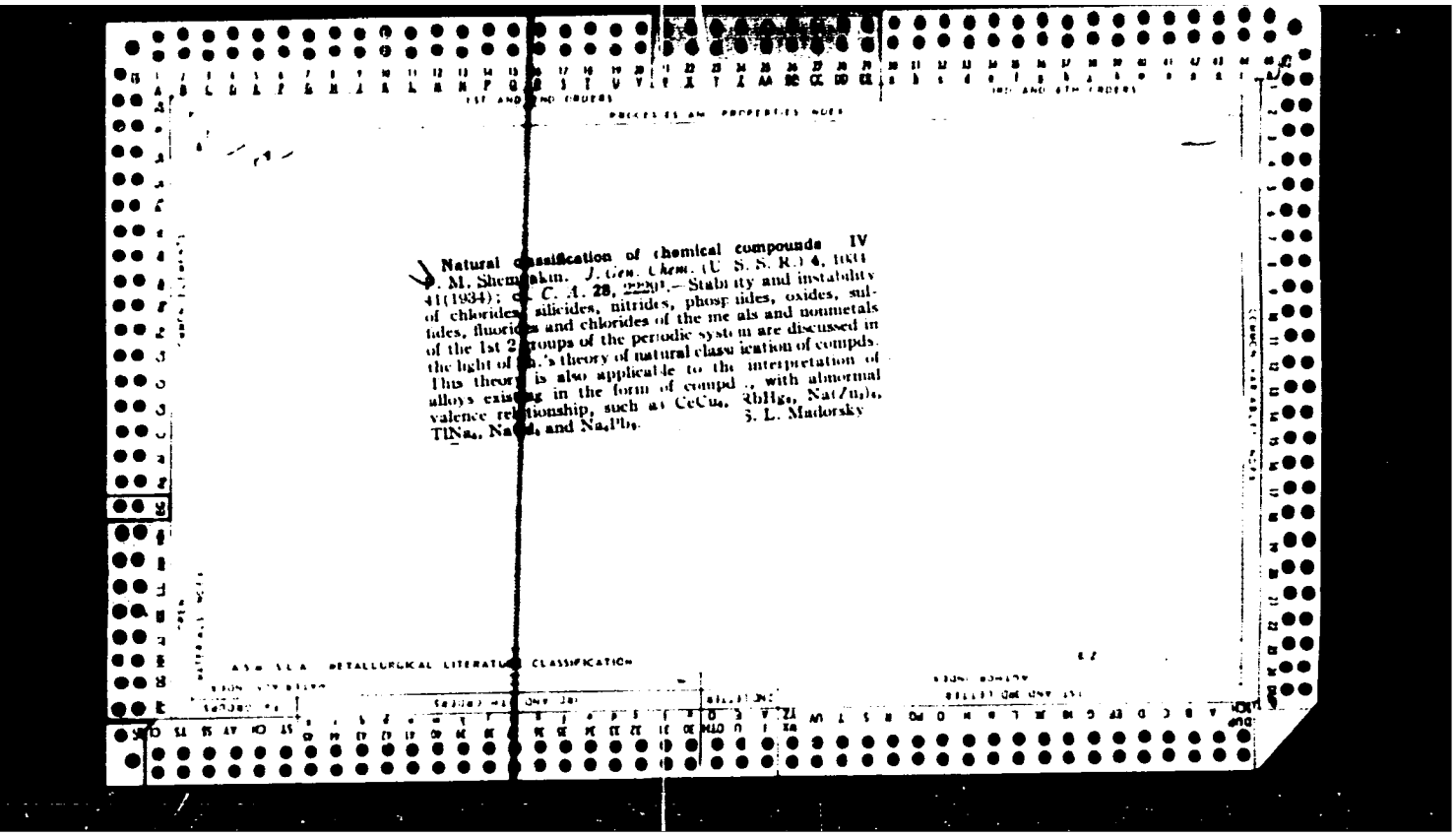
R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

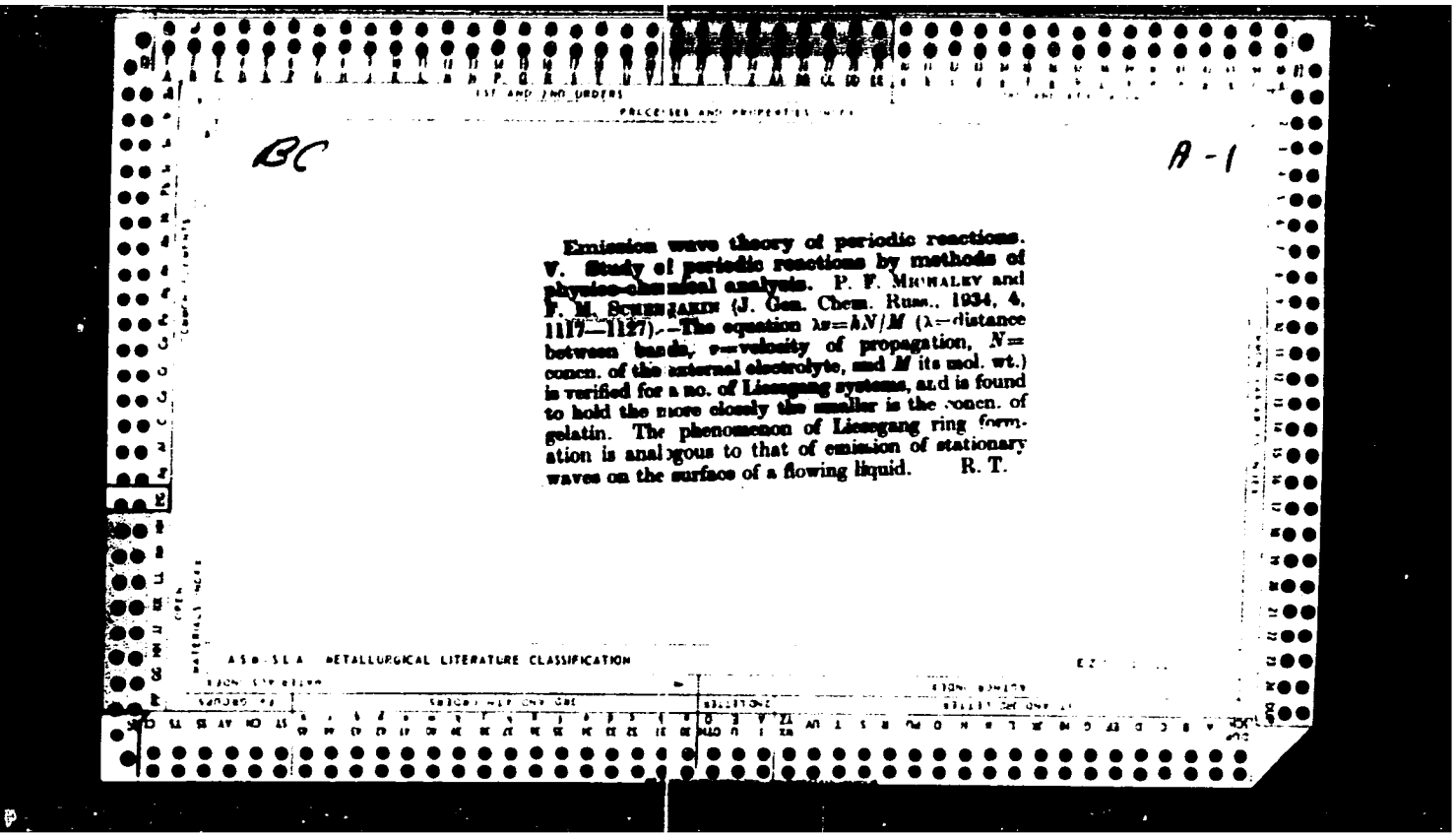


BC

Emission wave theory of periodic reactions. III. F. M. Schemjakin (J. Gen. Chem. Russ., 1934, 4, 444—451).—A mathematical derivation of the formula $\lambda r = \text{const.}$ (this vol., 363) is given. R. T.



Natural classification of chemical compounds IV
V. M. Shemyakin. *J. Gen. Chem.* (U. S. S. R.) 4, 1011-41(1934); *C. A.* **28**, 2220.— Stability and instability of chlorides, silicides, nitrides, phosphides, oxides, sulfides, fluorides and chlorides of the metals and nonmetals of the 1st 2 groups of the periodic system are discussed in the light of Fajans's theory of natural classification of compds. This theory is also applicable to the interpretation of alloys existing in the form of compds., with abnormal valence relationship, such as $CeCu_6$, $RbHg_2$, $NaTl_2$, $TlNa_2$, $NaPd_3$ and Na_4Pb_9.
S. L. Madorsky

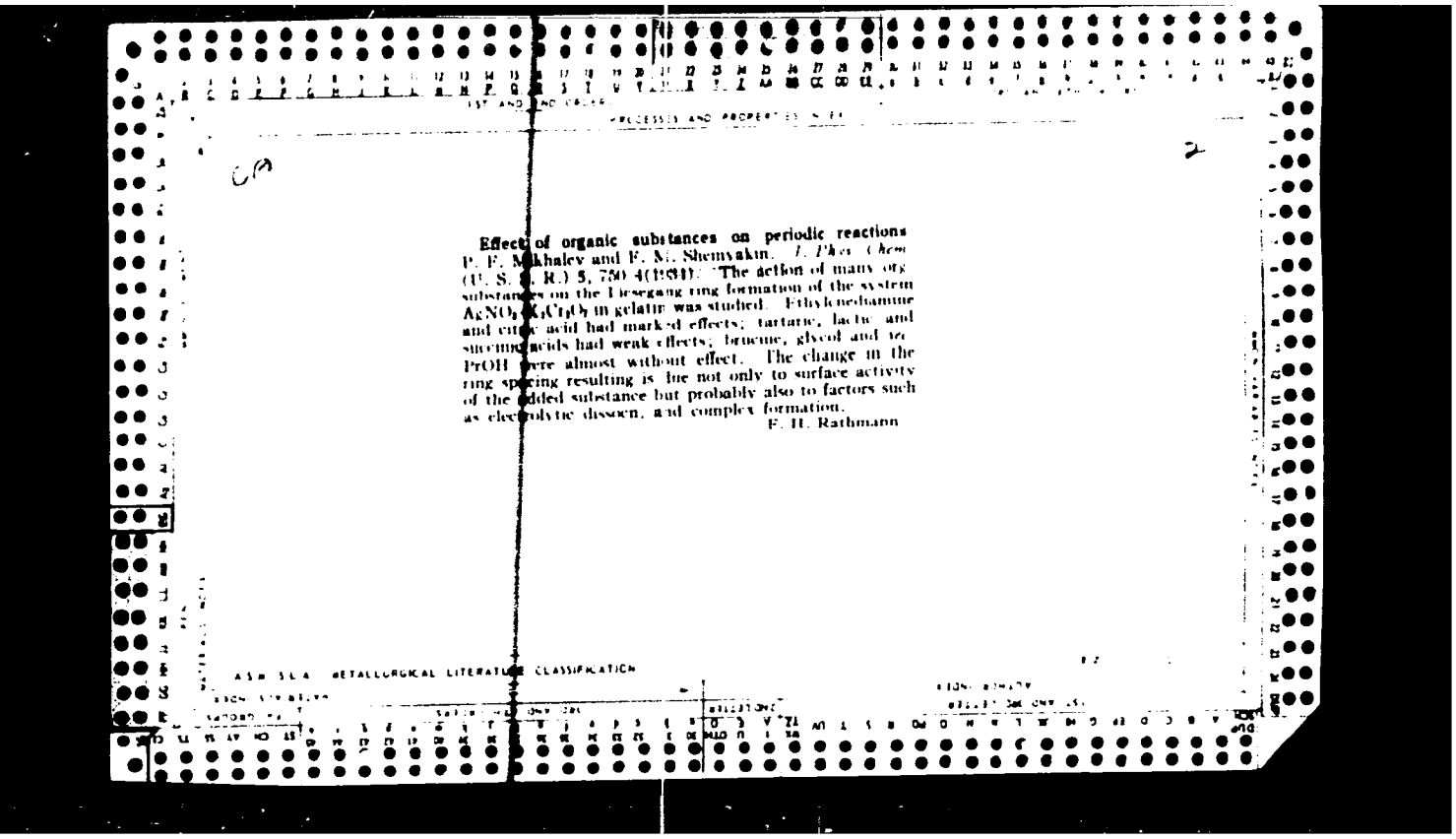


BC

A-1

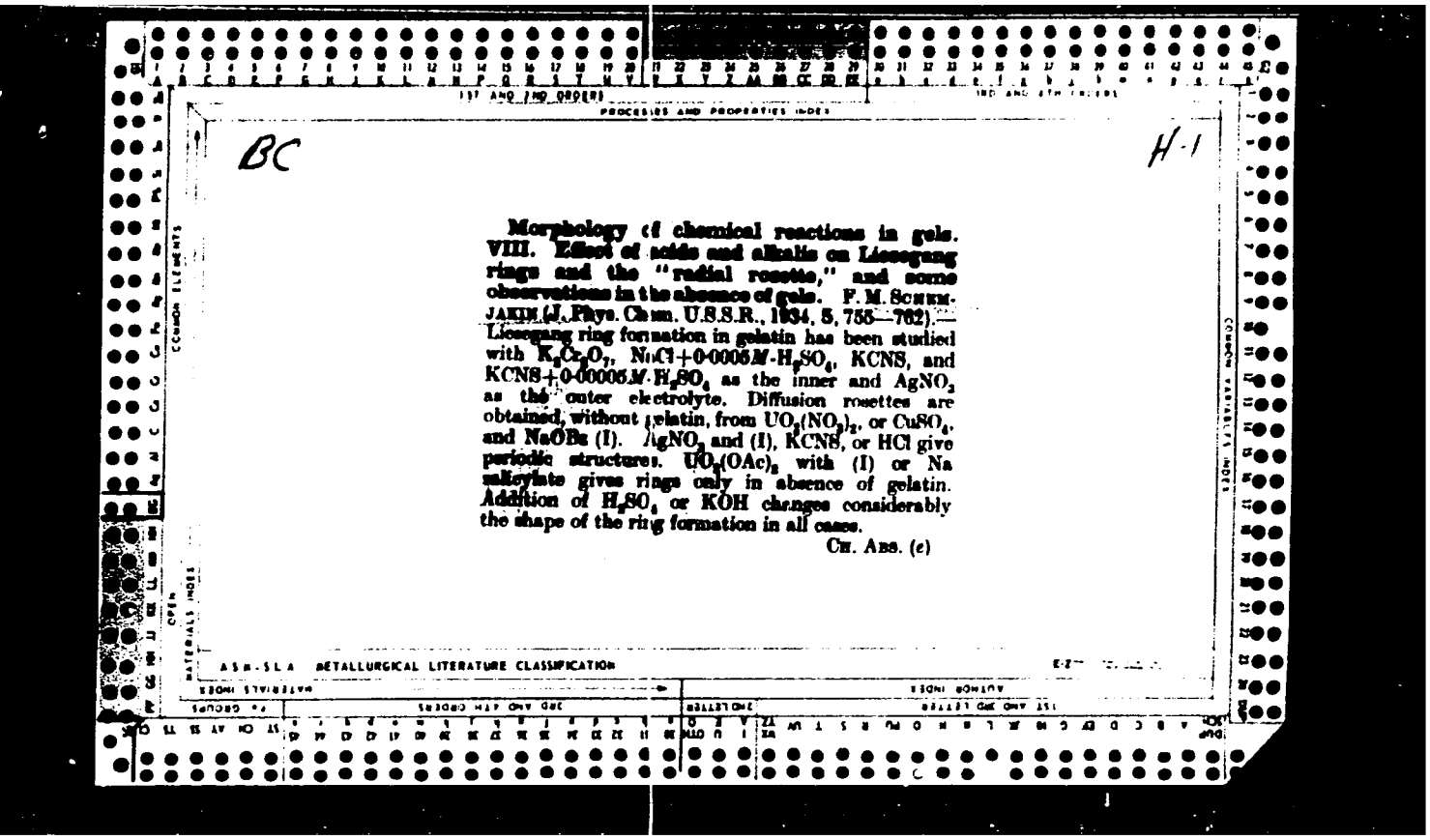
Emission wave theory of periodic reactions. V. Study of periodic reactions by methods of physico-chemical analysis. P. F. MIKHALEV and F. M. SCHEREMETKIN (J. Gen. Chem. Russ., 1934, 4, 1117—1127).—The equation $\lambda = vN/M$ (λ = distance between bands, v = velocity of propagation, N = concn. of the external electrolyte, and M its mol. wt.) is verified for a no. of Liesegang systems, and is found to hold the more closely the smaller is the concn. of gelatin. The phenomenon of Liesegang ring formation is analogous to that of emission of stationary waves on the surface of a flowing liquid. R. T.

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION



Effect of organic substances on periodic reactions P. F. Mikhalev and F. M. Shemyakin. *J. Phys. Chem.* (U. S. S. R.) 5, 750-4(1934). The action of many org. substances on the Liesegang ring formation of the system $AgNO_3$-K_2CrO_4 in gelatin was studied. Ethylenediamine and citric acid had marked effects; tartaric, lactic and succinic acids had weak effects; brucine, glycol and iso-PrOH were almost without effect. The change in the ring spacing resulting is due not only to surface activity of the added substance but probably also to factors such as electrolytic dissocn. and complex formation.

F. H. Rathmann

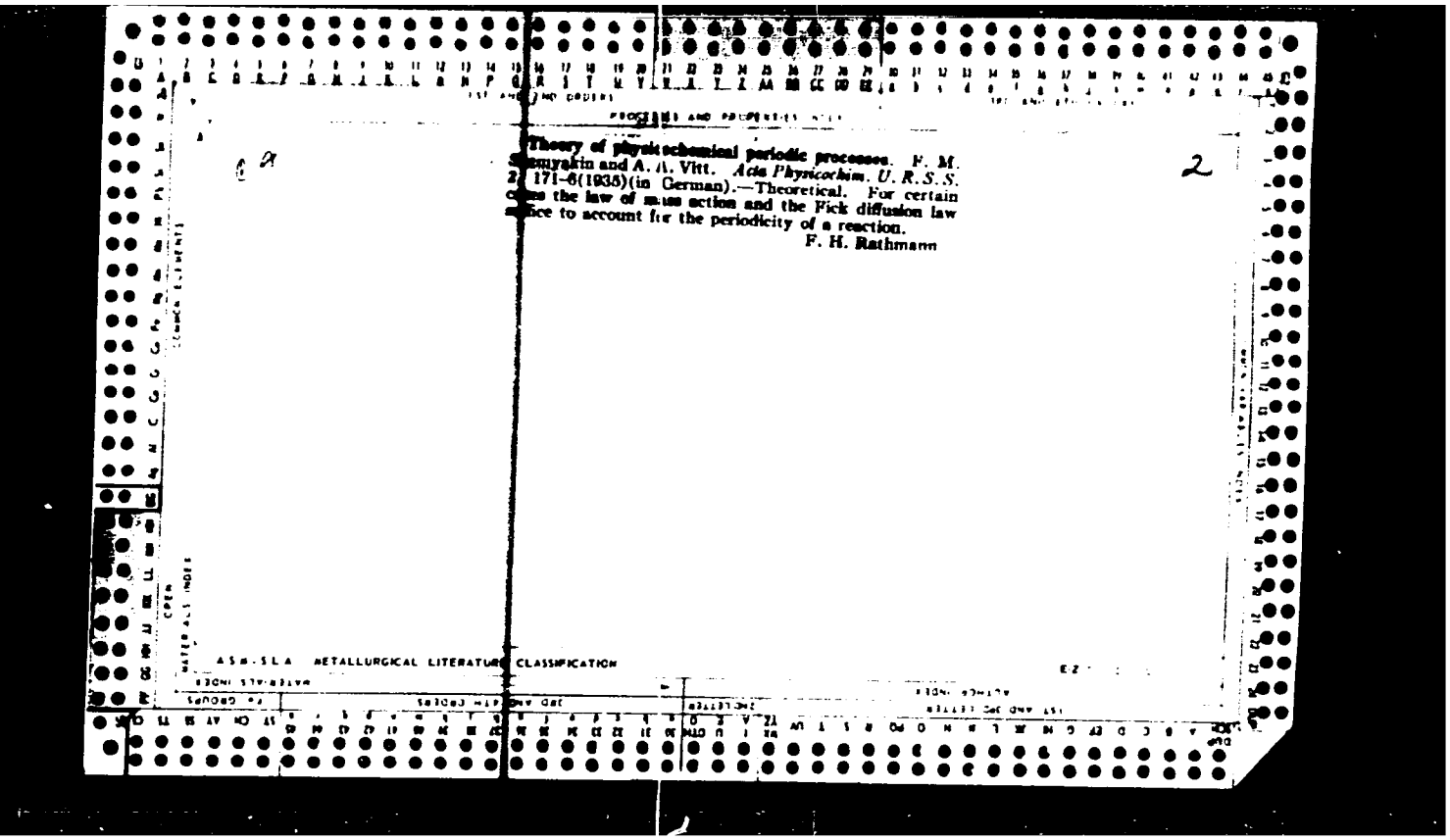


BC

H-1

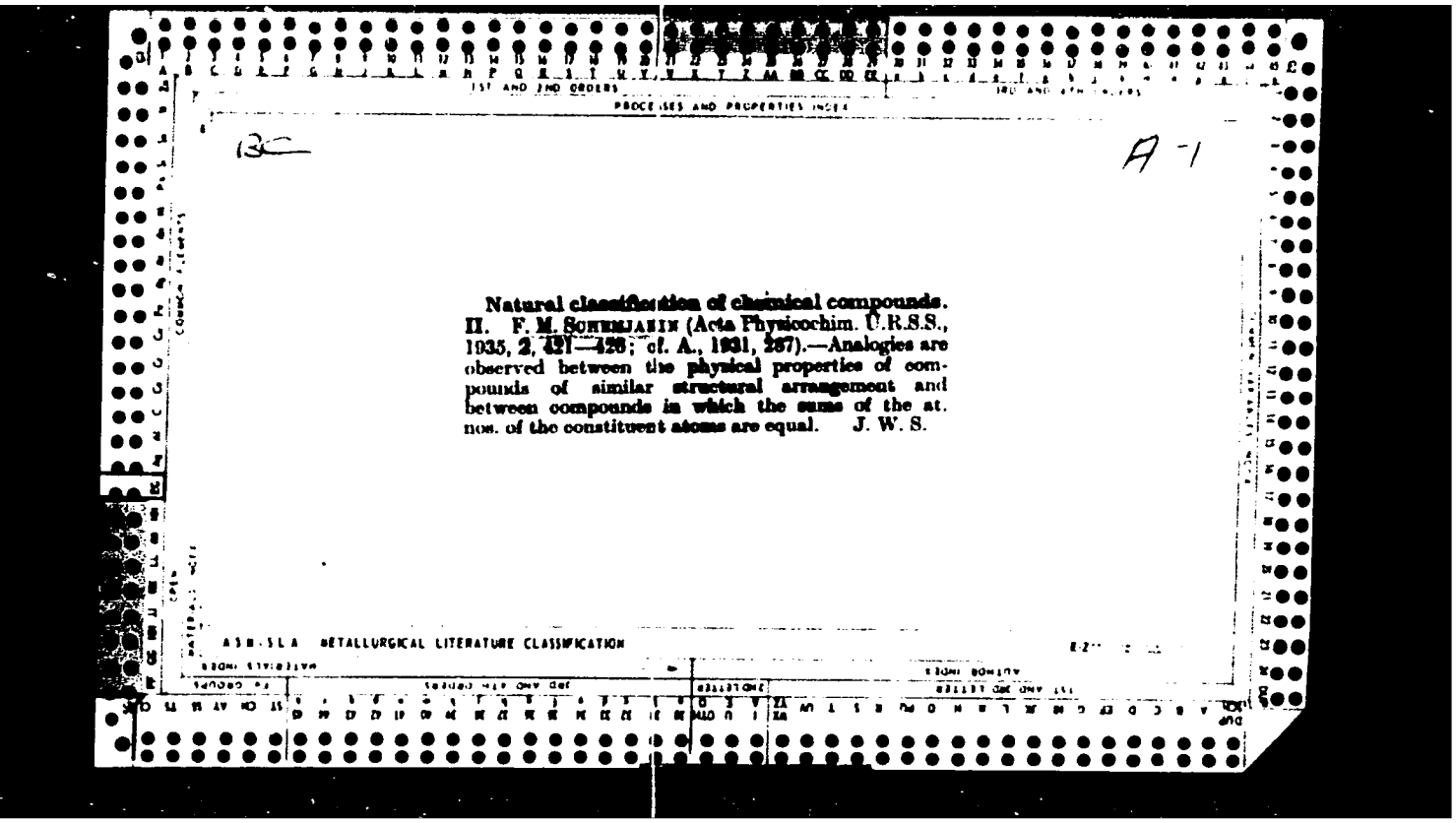
Morphology of chemical reactions in gels. VIII. Effect of acids and alkalis on Liesegang rings and the "radial rosette," and some observations in the absence of gels. P. M. SCHUM-JAKIN (J. Phys. Chem. U.S.S.R., 1934, 5, 755—762).—Liesegang ring formation in gelatin has been studied with $K_2Cr_2O_7$, NaCl+0·0005*M*-H_2SO_4, KCNS, and KCNS+0·00005*M*-H_2SO_4 as the inner and $AgNO_3$ as the outer electrolyte. Diffusion rosettes are obtained, without gelatin, from $UO_2(NO_3)_2$, or $CuSO_4$, and NaOBz (I). $AgNO_3$ and (I), KCNS, or HCl give periodic structures. $UO_2(OAc)_2$ with (I) or Na salicylate gives rings only in absence of gelatin. Addition of H_2SO_4 or KOH changes considerably the shape of the ring formation in all cases.

CH. ABS. (*e*)



Theory of physicochemical periodic processes. F. M. Shemyakin and A. A. Vitt. *Acta Physicochim. U. R. S. S.* 2, 171–6(1936)(in German).—Theoretical. For certain cases the law of mass action and the Fick diffusion law are insufficient to account for the periodicity of a reaction.

F. H. Rathmann



13C

A-1

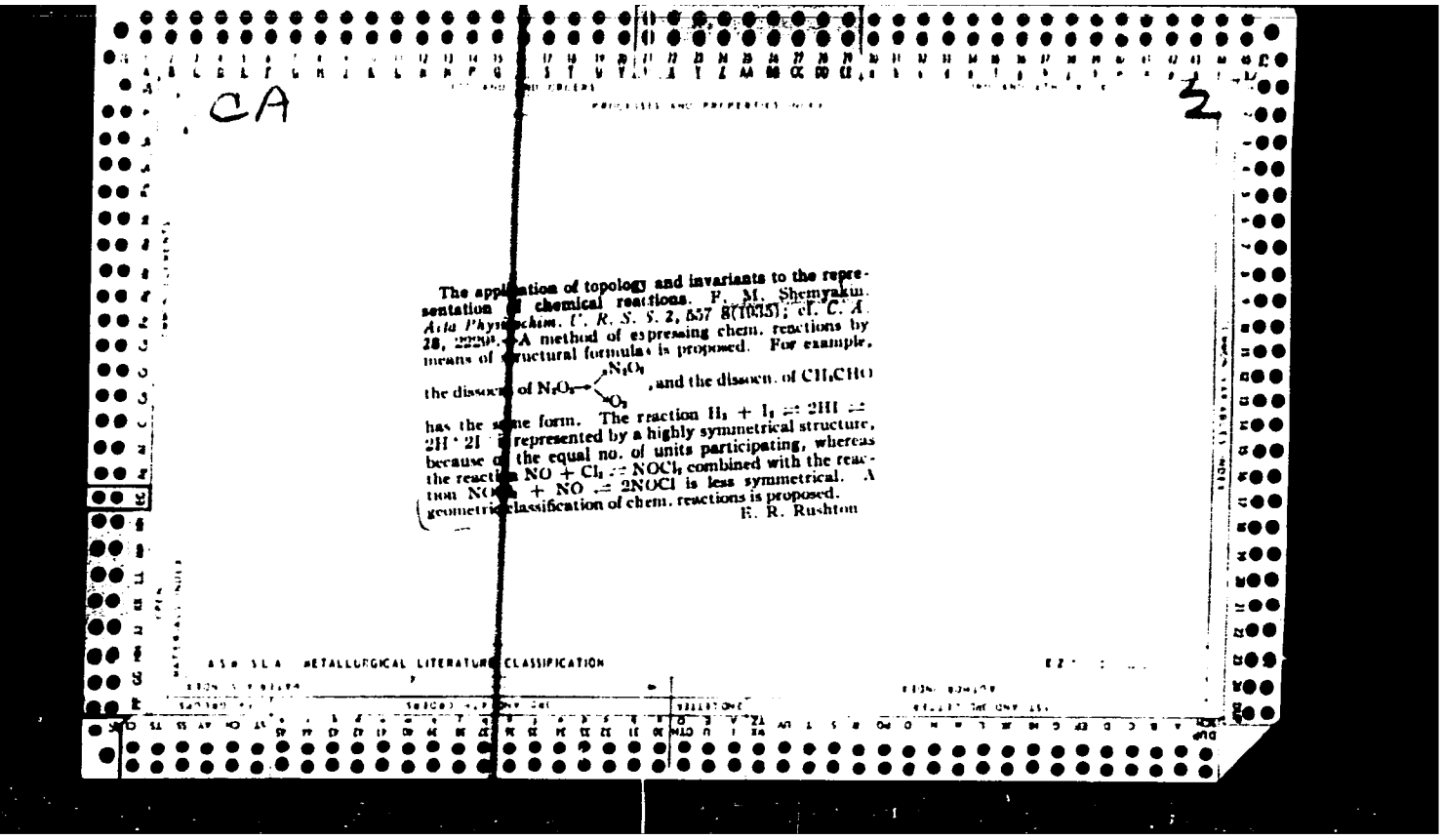
Natural classification of chemical compounds. II. F. M. Schemjakin (Acta Physicochim. U.R.S.S., 1935, 2, 421—426; cf. A., 1931, 287).—Analogies are observed between the physical properties of compounds of similar structural arrangement and between compounds in which the sums of the at. nos. of the constituent atoms are equal. J. W. S.

BC

A-1

Investigation of periodic reactions by application of physico-chemical analysis. —P. M. ŠCHUKIN, JAKIN and P. F. MICHALEV (Acta Physicochim. U.R.S.S., 1935, 2, 427—432; cf. A., 1934, 363).—The product of the distance between successive bands and the velocity of diffusion for Liesegang ring type periodic structures produced with $K_2Cr_2O_7$ and $AgNO_3$ diffusing in gelatin varies with the concn. of the gel and of the electrolytes. Periodic pptns. have also been obsc-ved with $K_2Cr_2O_7$ and neutral-red, $K_4Fe(CN)_6$ and methylene-blue, and with $K_2Cr_2O_7$ and Me-violet, all in gelatin. J. W. S.

A S M - S L A METALLURGICAL LITERATURE CLASSIFICATION



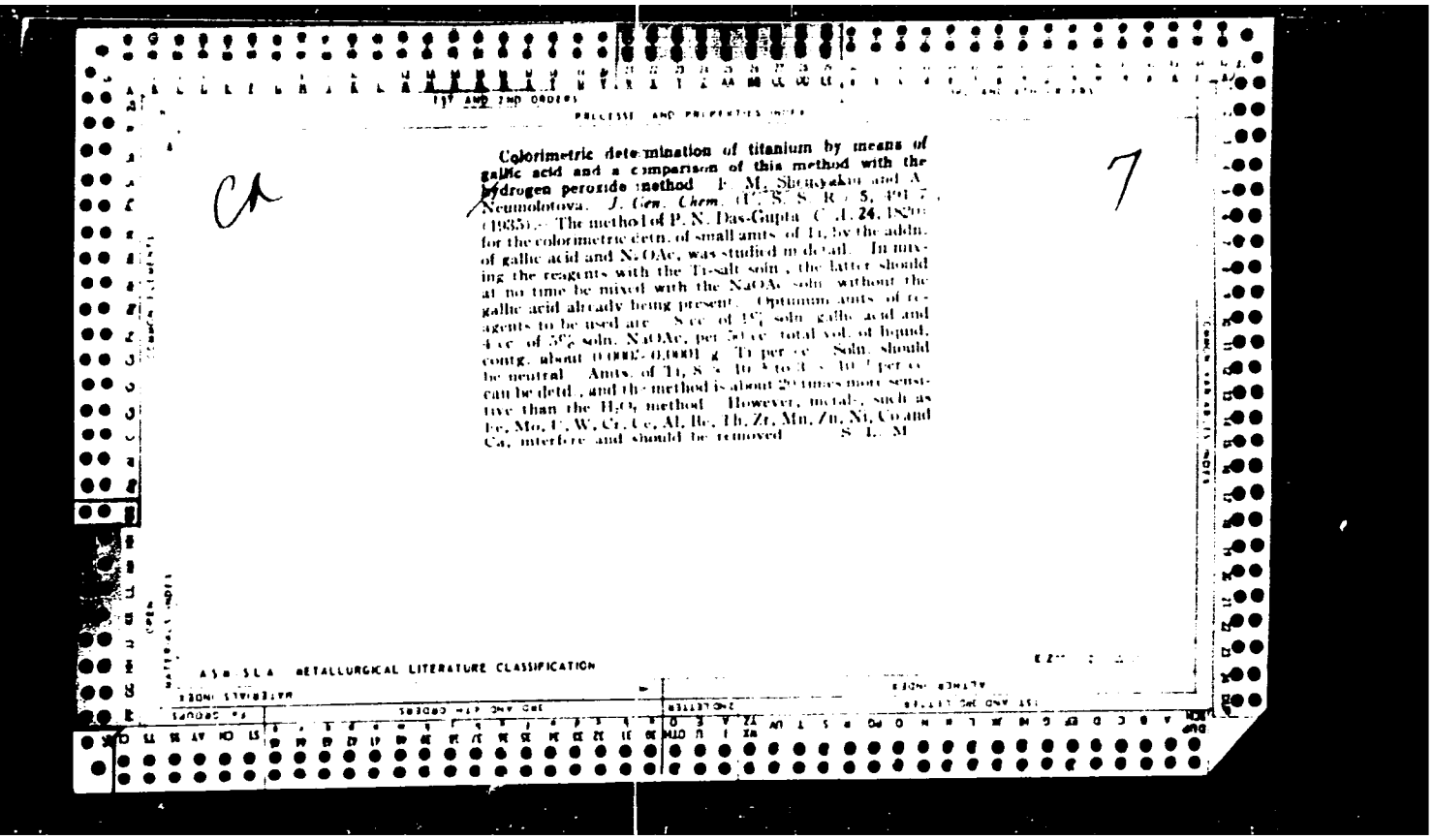
CA

2

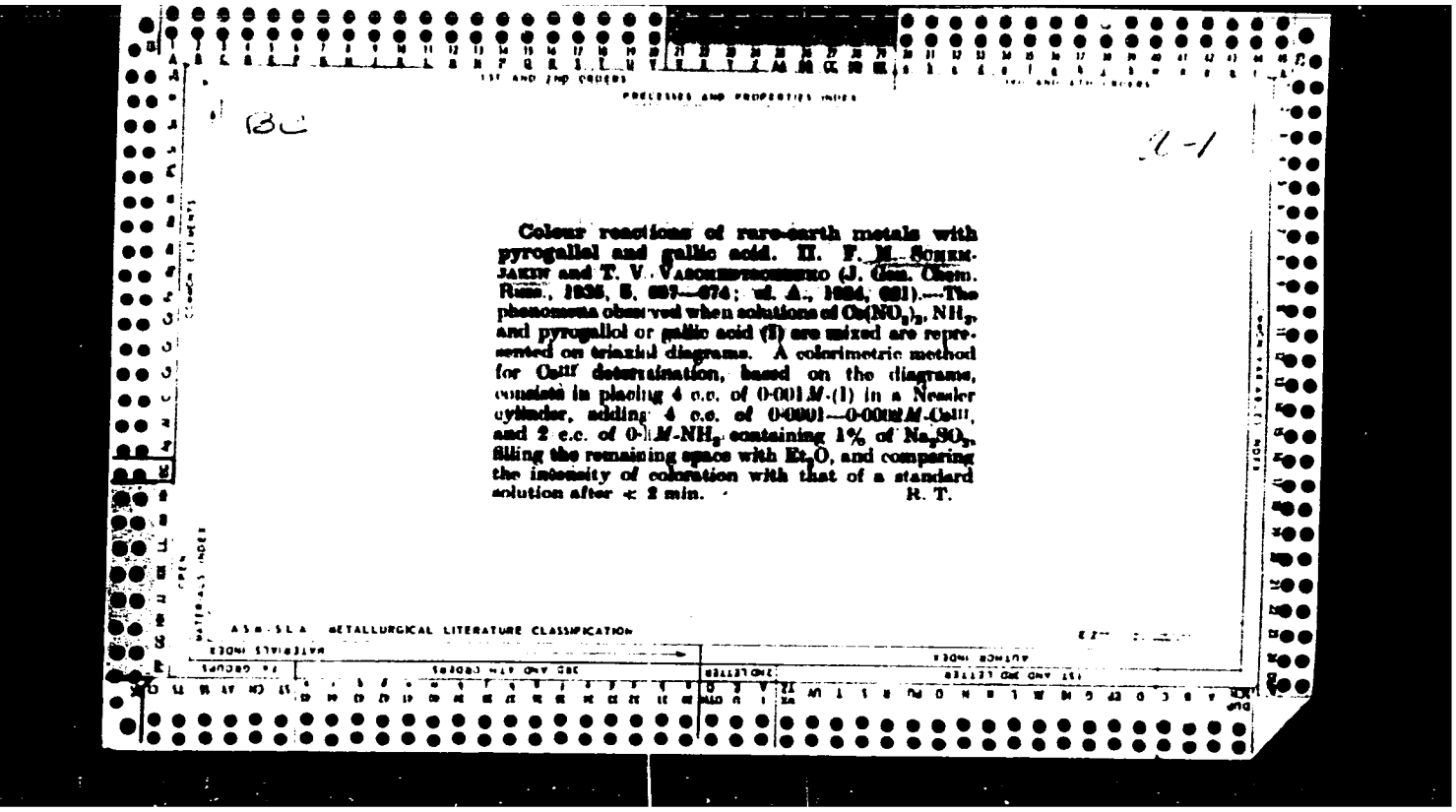
The application of topology and invariants to the representation of chemical reactions. F. M. Shemyakin. *Acta Physicochim. U. R. S. S.* 2, 557-8(1935); cf. *C. A.* 28, 2220.—A method of expressing chem. reactions by means of structural formulas is proposed. For example, the dissocn. of N_2O_4 , and the dissocn. of CH_3CHO has the same form. The reaction $H_2 + I_2 \rightleftarrows 2HI \rightleftarrows 2H + 2I$ is represented by a highly symmetrical structure, because of the equal no. of units participating, whereas the reaction $NO + Cl_2 \rightleftarrows NOCl_2$ combined with the reaction $NOCl_2 + NO \rightleftarrows 2NOCl$ is less symmetrical. A geometrical classification of chem. reactions is proposed.

E. R. Rushton

ASM METALLURGICAL LITERATURE CLASSIFICATION



Colorimetric determination of titanium by means of gallic acid and a comparison of this method with the hydrogen peroxide method I. M. Shtrygakin and A. Neumolotova. *J. Gen. Chem.* (U. S. S. R.) 5, 491-7 (1935).—The method of P. N. Das-Gupta (*C. A.* 24, 1820; 1930) for the colorimetric detn. of small amts. of Ti, by the addn. of gallic acid and NaOAc, was studied in detail. In mixing the reagents with the Ti-salt soln., the latter should at no time be mixed with the NaOAc soln. without the gallic acid already being present. Optimum amts. of reagents to be used are: 5 cc. of 1% soln. gallic acid and 4 cc. of 5% soln. NaOAc, per 5 cc. total vol. of liquid, contg. about 0.0002–0.0001 g. Ti per cc. Soln. should be neutral. Amts. of Ti, 8 × 10⁻⁵ to 3 × 10⁻⁴ g. per cc. can be detd., and the method is about 20 times more sensitive than the H_2O_2 method. However, metals, such as Fe, Mo, U, W, Cr, Ce, Al, Be, Th, Zr, Mn, Zn, Ni, Co and Ca, interfere and should be removed. S. L. M.



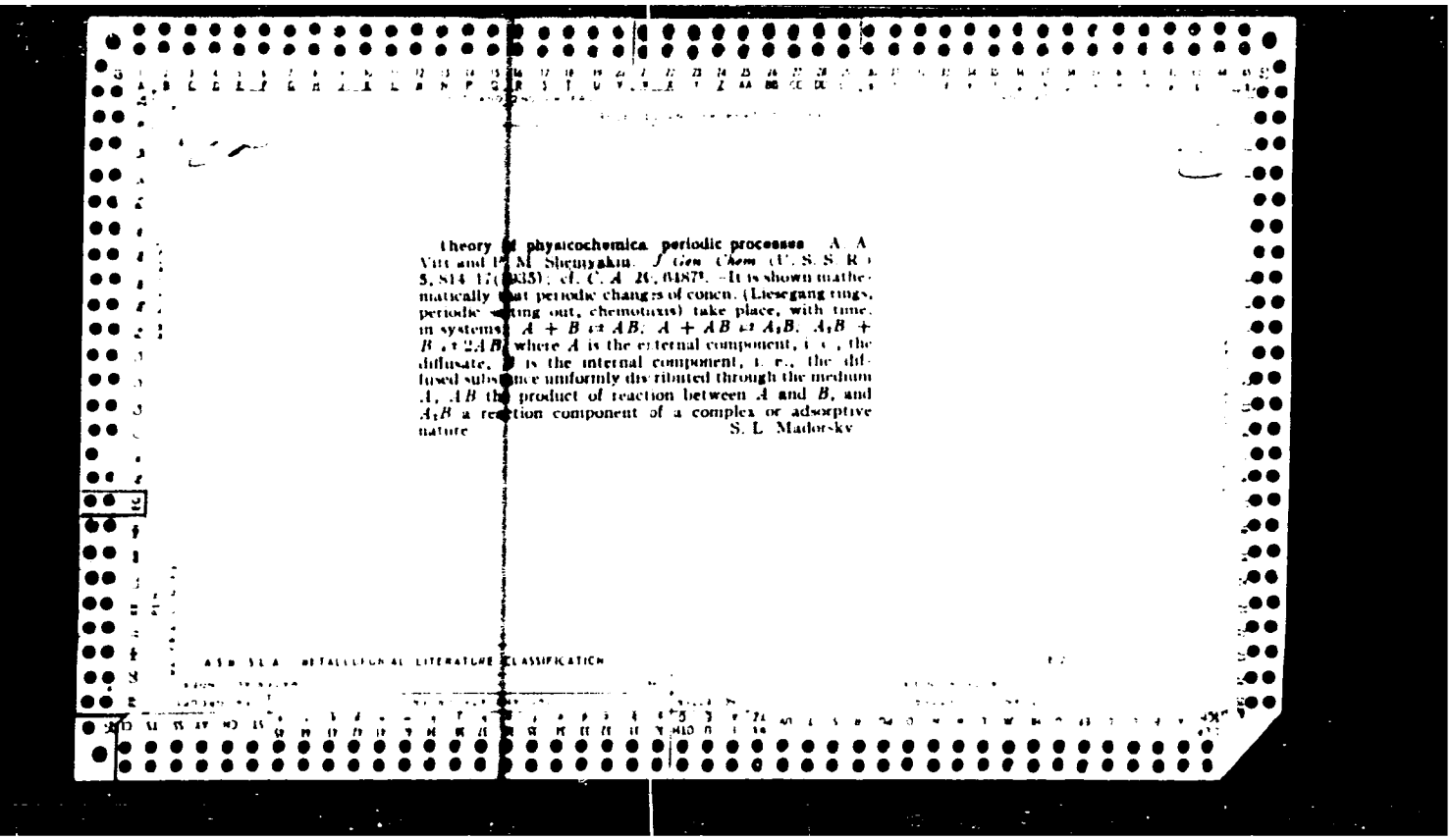
PROCESSES AND PROPERTIES INDEX

B C

X-1

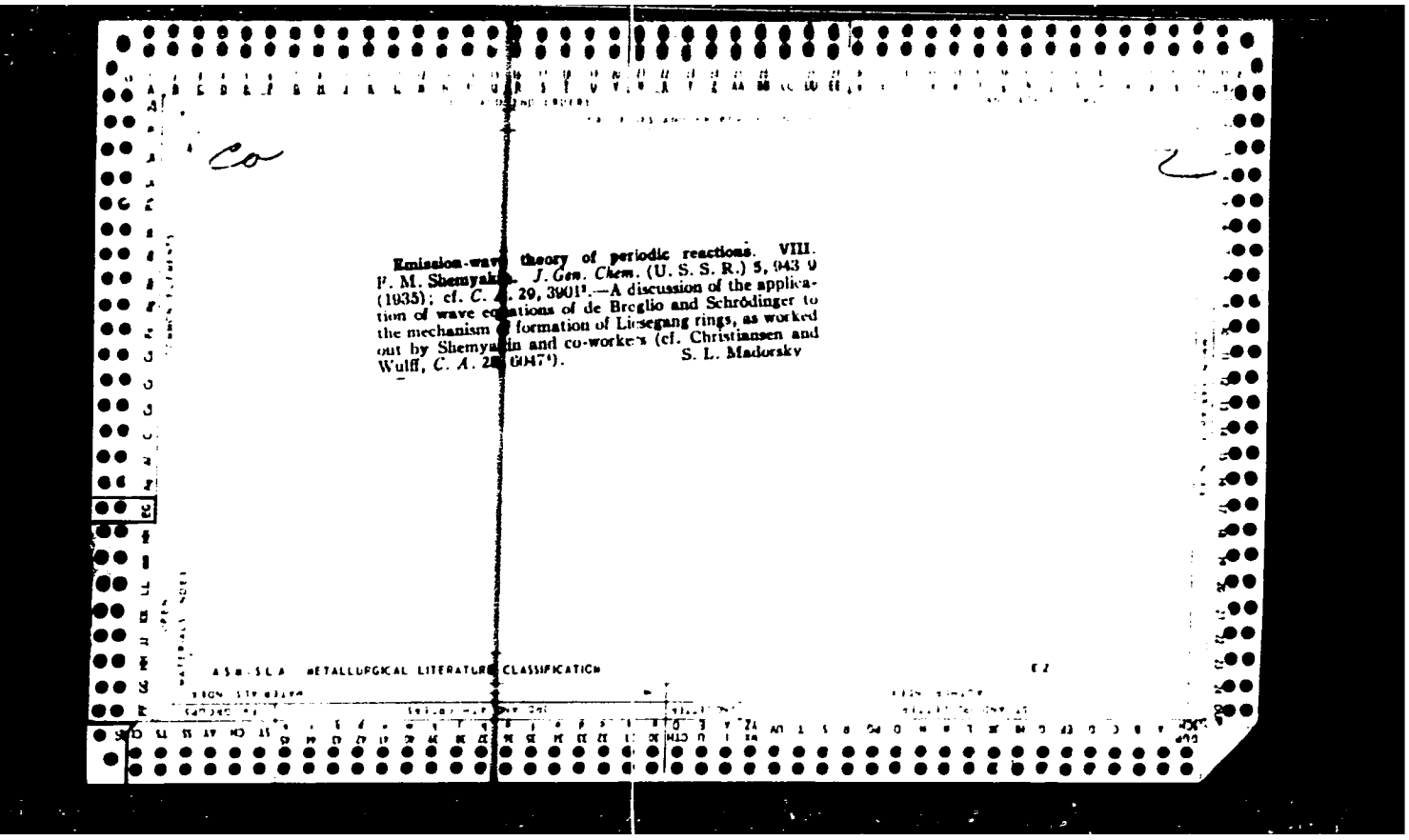
Colour reactions of rare-earth metals with pyrogallol and gallic acid. II. F. M. Shemyakin and T. V. Vasconcheenko (J. Gen. Chem. Russ., 1936, 6, 667—674; cf. A., 1934, 681).—The phenomena observed when solutions of $Ce(NO_3)_3$, NH_3, and pyrogallol or gallic acid (I) are mixed are represented on triaxial diagrams. A colorimetric method for Ce^{III} determination, based on the diagrams, consists in placing 4 c.c. of 0·001*M*-(I) in a Nessler cylinder, adding 4 c.c. of 0·0001—0·0002*M*-Ce^{III}, and 2 c.c. of 0·1*M*-NH_3 containing 1% of Na_2SO_3, filling the remaining space with Et_2O, and comparing the intensity of coloration with that of a standard solution after < 2 min. R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

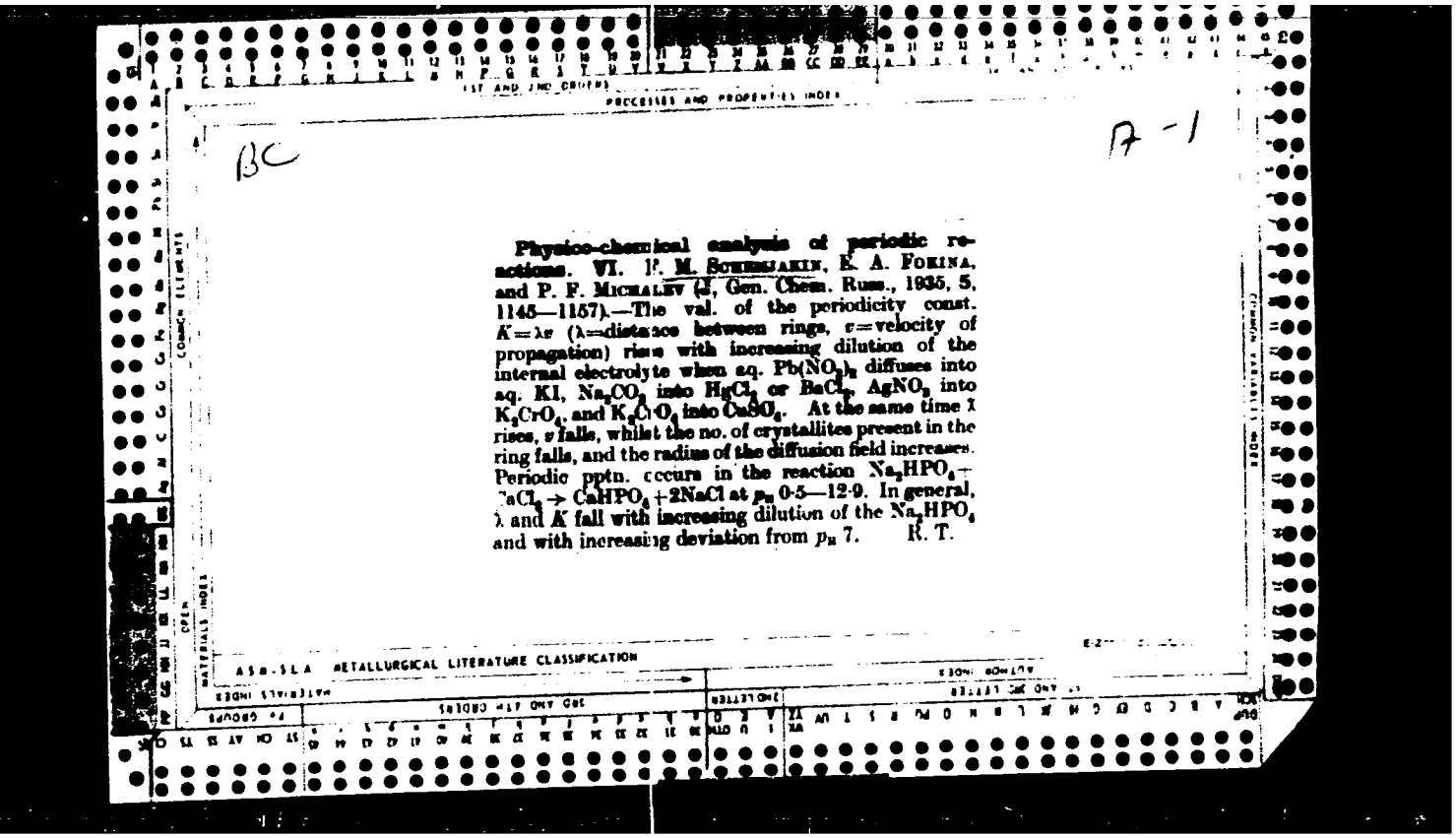


Theory of physicochemical periodic processes. A. A. Vitt and I. M. Shmyakin. *J. Gen. Chem.* (U. S. S. R.) 5, 814–17 (1935); cf. *C. A.* 26, 6487⁹. —It is shown mathematically that periodic changes of concn. (Liesegang rings, periodic setting out, chemotaxis) take place, with time, in systems $A + B \rightleftarrows AB$, $A + AB \rightleftarrows A_2B$, $A_2B + B \rightleftarrows 2AB$, where A is the external component, i. e., the diffusate, B is the internal component, i. e., the diffused substance uniformly distributed through the medium A, AB the product of reaction between A and B, and A_2B a reaction component of a complex or adsorptive nature. S. L. Madorsky

A S M S L A METALLURGICAL LITERATURE CLASSIFICATION



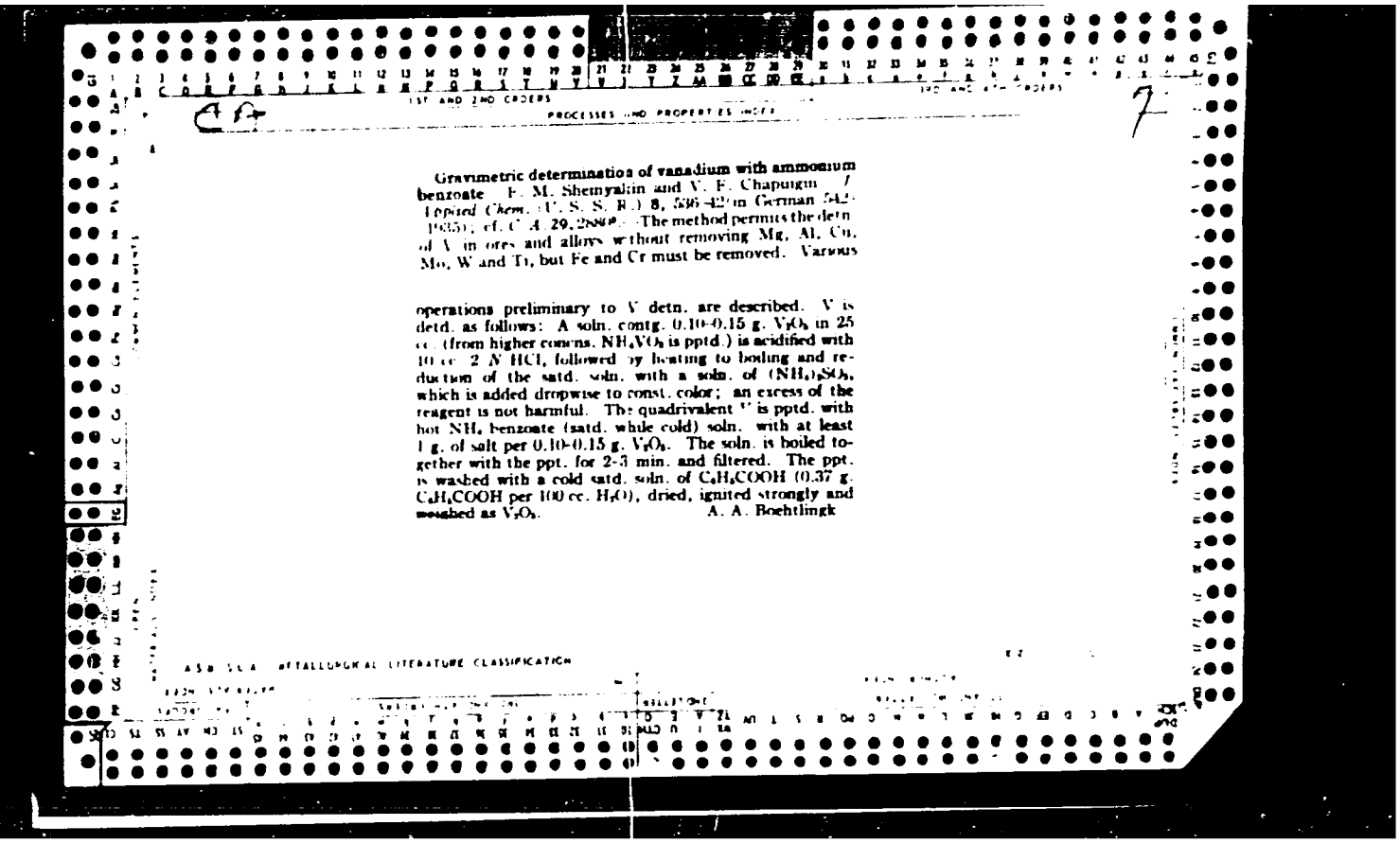
Emission-wave theory of periodic reactions. VIII. P. M. Shemyakin. *J. Gen. Chem.* (U. S. S. R.) 5, 943-9 (1935); cf. *C. A.* 29, 3901[1].—A discussion of the application of wave equations of de Broglio and Schrödinger to the mechanism of formation of Liesegang rings, as worked out by Shemyakin and co-workers (cf. Christiansen and Wulff, *C. A.* 28, 6047[4]). S. L. Madorsky



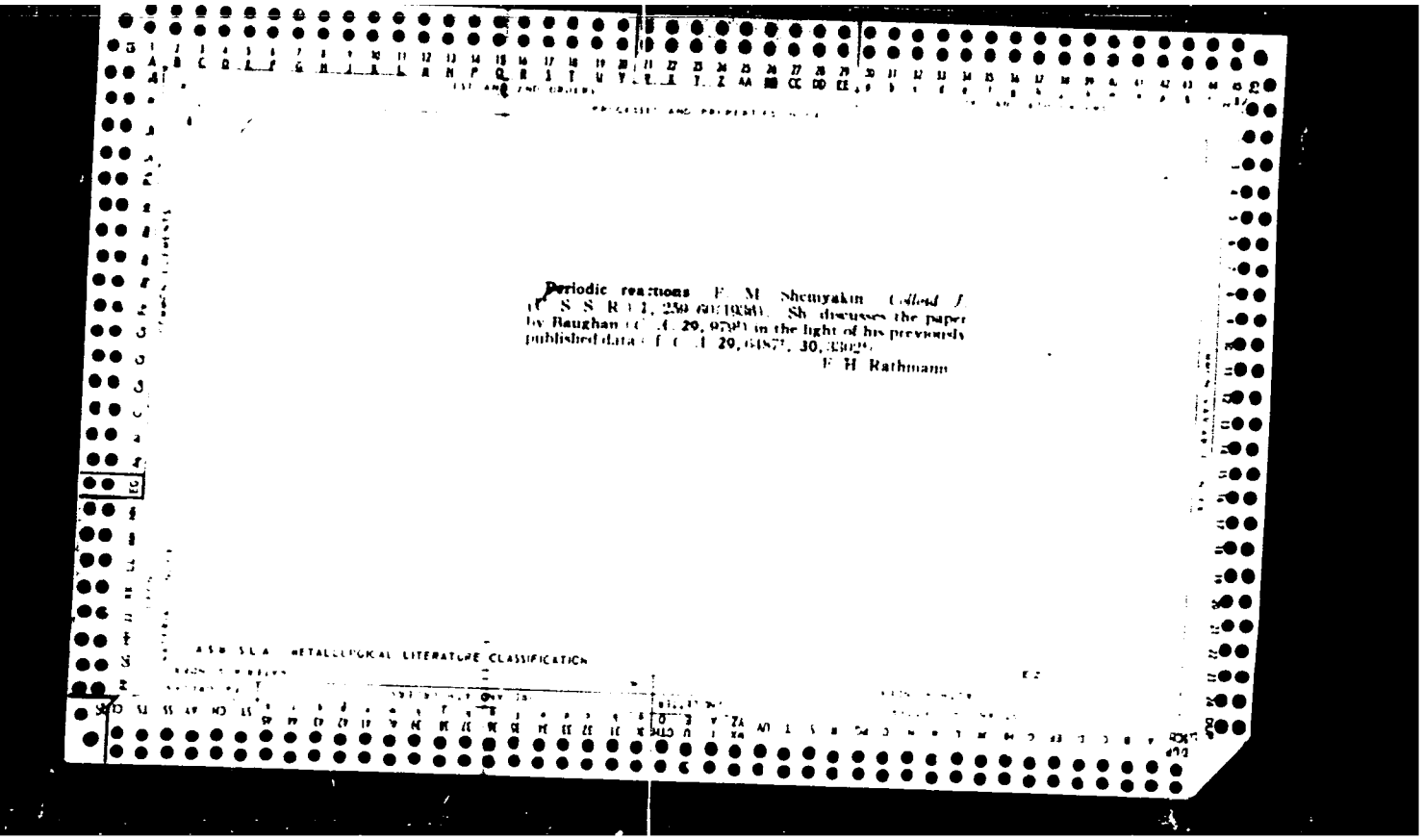
BC

A-1

Physico-chemical analysis of periodic reactions. VI. I. M. SCHEMJAKIN, E. A. FOKINA, and P. F. MICHALEV (J. Gen. Chem. Russ., 1935, 5, 1145—1157).—The val. of the periodicity const. $K=\lambda v$ (λ=distance between rings, v=velocity of propagation) rises with increasing dilution of the internal electrolyte when aq. $Pb(NO_3)_2$ diffuses into aq. KI, Na_2CO_3 into $HgCl_2$ or $BaCl_2$, $AgNO_3$ into K_2CrO_4, and $K_2Cr_2O_7$ into $CuSO_4$. At the same time λ rises, v falls, whilst the no. of crystallites present in the ring falls, and the radius of the diffusion field increases. Periodic pptn. occurs in the reaction $Na_2HPO_4+CaCl_2 \rightarrow CaHPO_4+2NaCl$ at p_H 0·5—12·9. In general, λ and K fall with increasing dilution of the Na_2HPO_4 and with increasing deviation from p_H 7. R. T.

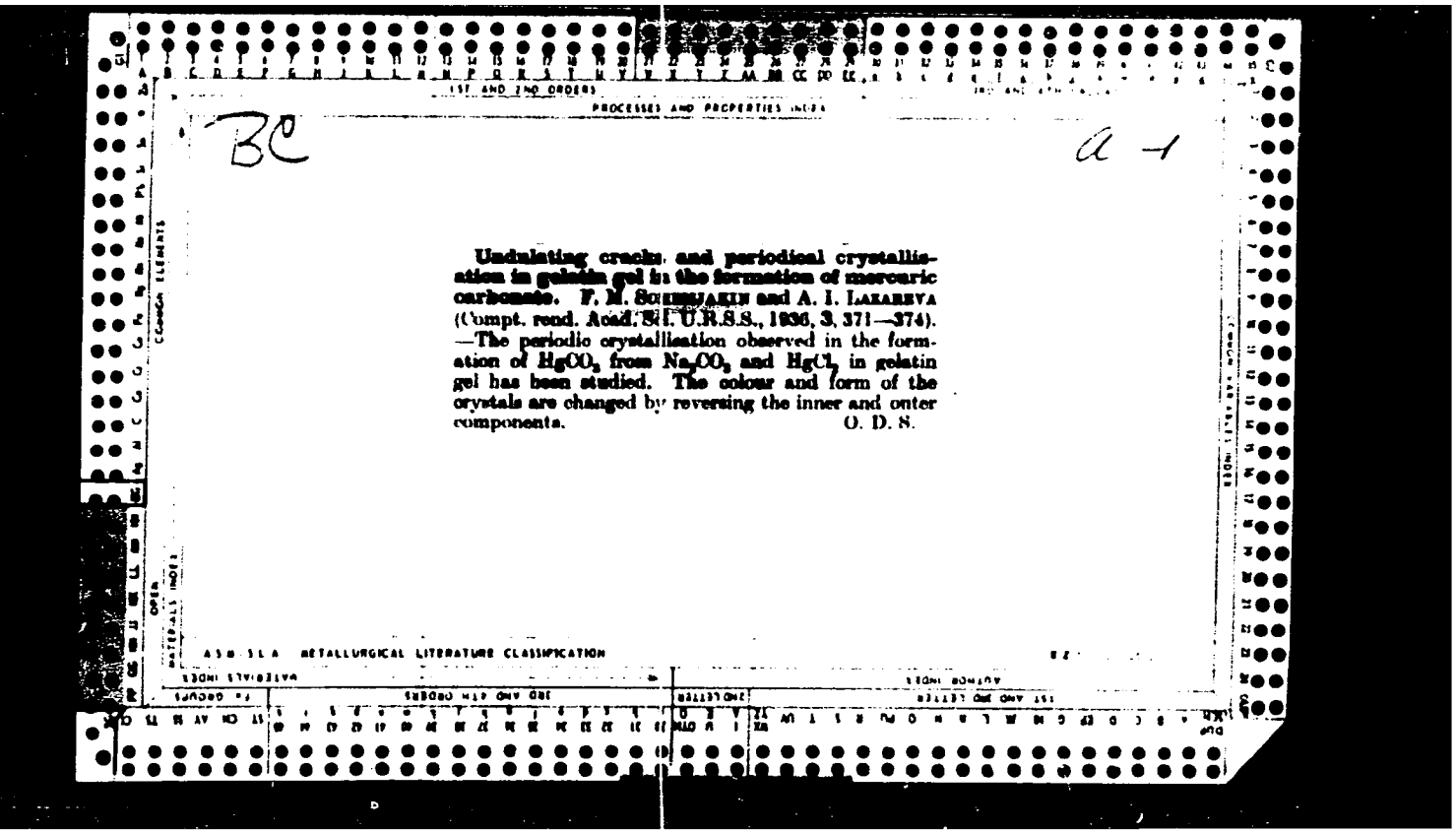


Gravimetric determination of vanadium with ammonium benzoate. F. M. Shemyakin and V. F. Chapurgin. *Zhavod. Lab.* (U. S. S. R.) 8, 536-42 (in German 542-3) (1935); cf. *C. A.* 29, 2888⁹. The method permits the detn. of V in ores and alloys without removing Mg, Al, Co, Mo, W and Ti, but Fe and Cr must be removed. Various operations preliminary to V detn. are described. V is detd. as follows: A soln. contg. 0.10-0.15 g. V_2O_5 in 25 cc. (from higher concns. NH_4VO_3 is pptd.) is acidified with 10 cc. 2 *N* HCl, followed by heating to boiling and reduction of the satd. soln. with a soln. of $(NH_4)_2SO_3$, which is added dropwise to const. color; an excess of the reagent is not harmful. The quadrivalent V is pptd. with hot NH_4 benzoate (satd. while cold) soln. with at least 1 g. of salt per 0.10-0.15 g. V_2O_5. The soln. is boiled together with the ppt. for 2-3 min. and filtered. The ppt. is washed with a cold satd. soln. of C_6H_5COOH (0.37 g. C_6H_5COOH per 100 cc. H_2O), dried, ignited strongly and weighed as V_2O_5. A. A. Boehtlingk



Periodic reactions F. M. Shemyakin *Collect. J. Chem. U.S.S.R.* 1, 230 (in English) (1936). Sh. discusses the paper by Baughan (*C.A.* 29, 9738) in the light of his previously published data (*C.A.* 29, 6187; 30, 3802).

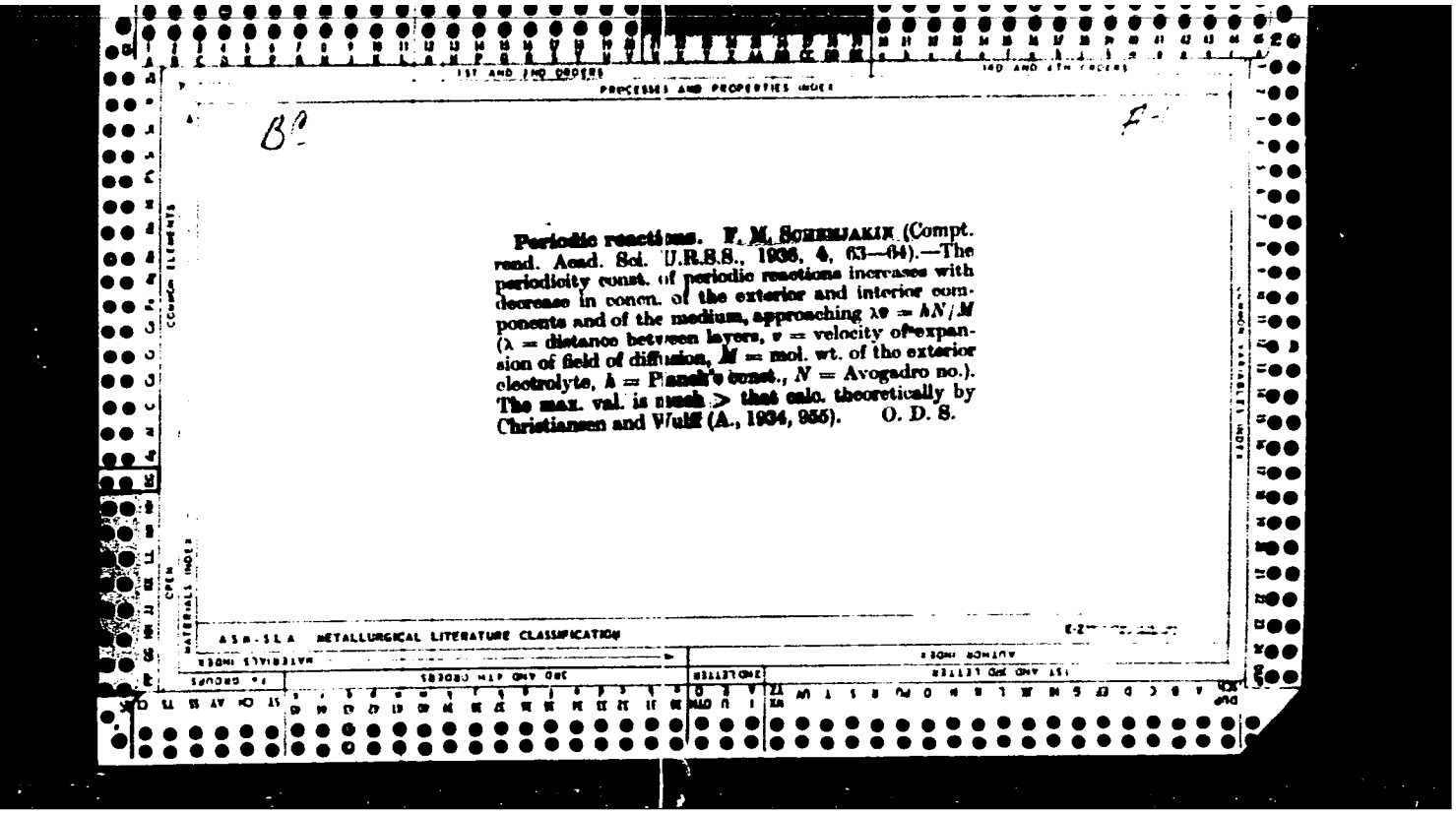
F. H. Rathmann



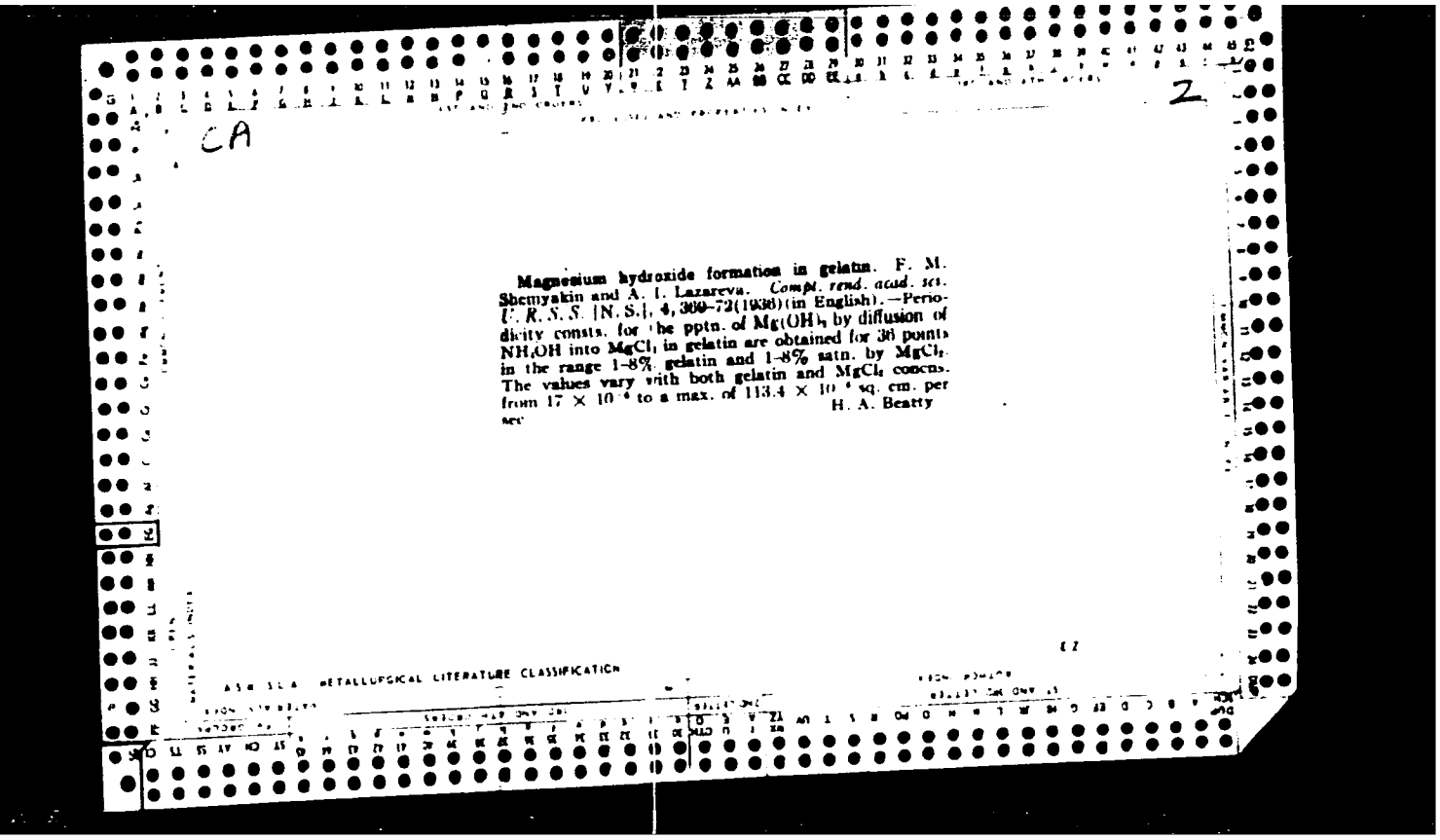
BC

a-1

Undulating cracks and periodical crystallisation in gelatin gel in the formation of mercuric carbonate. F. M. Schemjakin and A. I. Lazareva (Compt. rend. Acad. Sci. U.R.S.S., 1936, 3, 371—374). —The periodic crystallisation observed in the formation of $HgCO_3$ from Na_2CO_3 and $HgCl_2$ in gelatin gel has been studied. The colour and form of the crystals are changed by reversing the inner and outer components. O. D. S.



Periodic reactions. F. M. SCHEMJAKIN (Compt. rend. Acad. Sci. U.R.S.S., 1936, 4, 63—64).—The periodicity const. of periodic reactions increases with decrease in concn. of the exterior and interior components and of the medium, approaching $\lambda v = AN/M$ (λ = distance between layers, v = velocity of expansion of field of diffusion, M = mol. wt. of the exterior electrolyte, A = Planck's const., N = Avogadro no.). The max. val. is much > that calc. theoretically by Christiansen and Wulff (A., 1934, 955). O. D. S.



CA

2

Magnesium hydroxide formation in gelatin. F. M. Shemyakin and A. I. Lazareva. *Compt. rend. acad. sci. U. R. S. S.* [N. S.], 4, 309–72(1938)(in English).—Periodicity consts. for the pptn. of $Mg(OH)_2$ by diffusion of NH_4OH into $MgCl_2$ in gelatin are obtained for 36 points in the range 1–8% gelatin and 1–8% satn. by $MgCl_2$. The values vary with both gelatin and $MgCl_2$ concns. from 17×10^{-6} to a max. of 113.4×10^{-6} sq. cm. per sec.

H. A. Beatty

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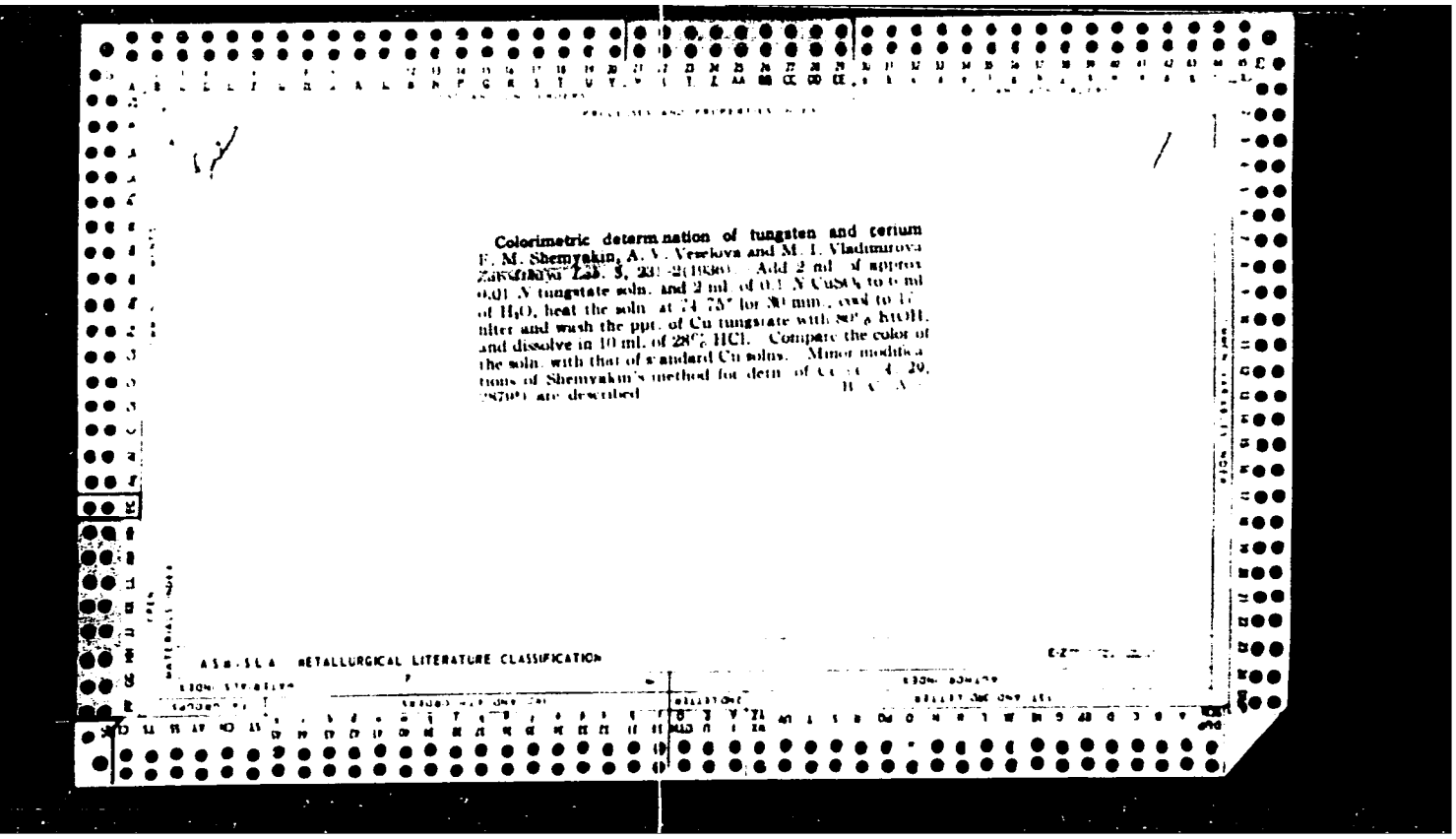

Colorimetric determination of tungsten and cerium
F. M. Shemyakin, A. V. Veselova and M. I. Vladimirova
Zavodskaya Lab. 5, 231-2(1936). Add 2 ml. of approx 0.01 *N* tungstate soln. and 2 ml. of 0.1 *N* $CuSO_4$ to 6 ml of H_2O, heat the soln. at 74-75° for 30 min., cool to 1[illegible] filter and wash the ppt. of Cu tungstate with 50% KOH, and dissolve in 10 ml. of 28% HCl. Compare the color of the soln. with that of standard Cu solns. Minor modifications of Shemyakin's method for determ. of Ce [illegible] 20, 870(1) are described.

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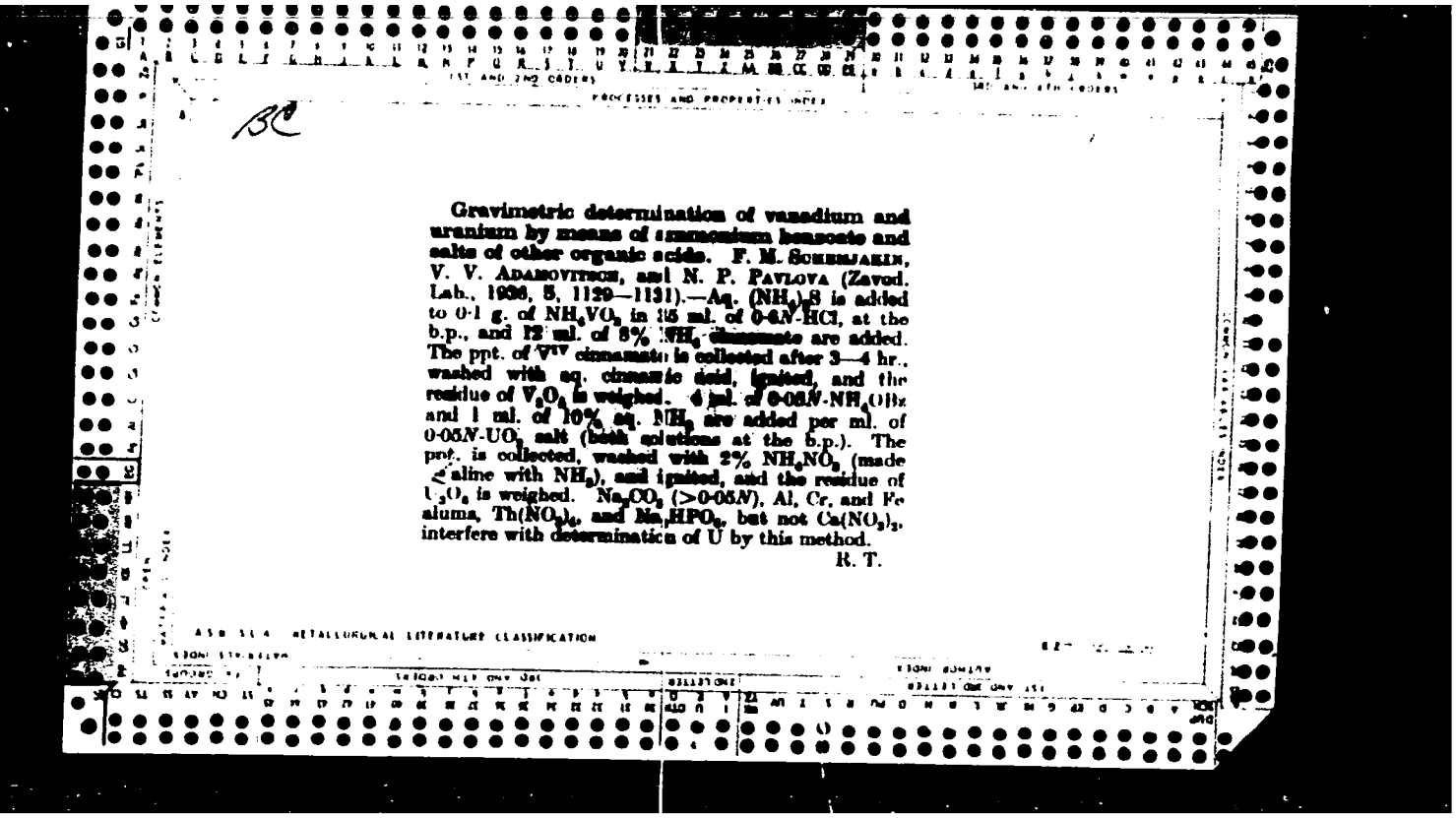
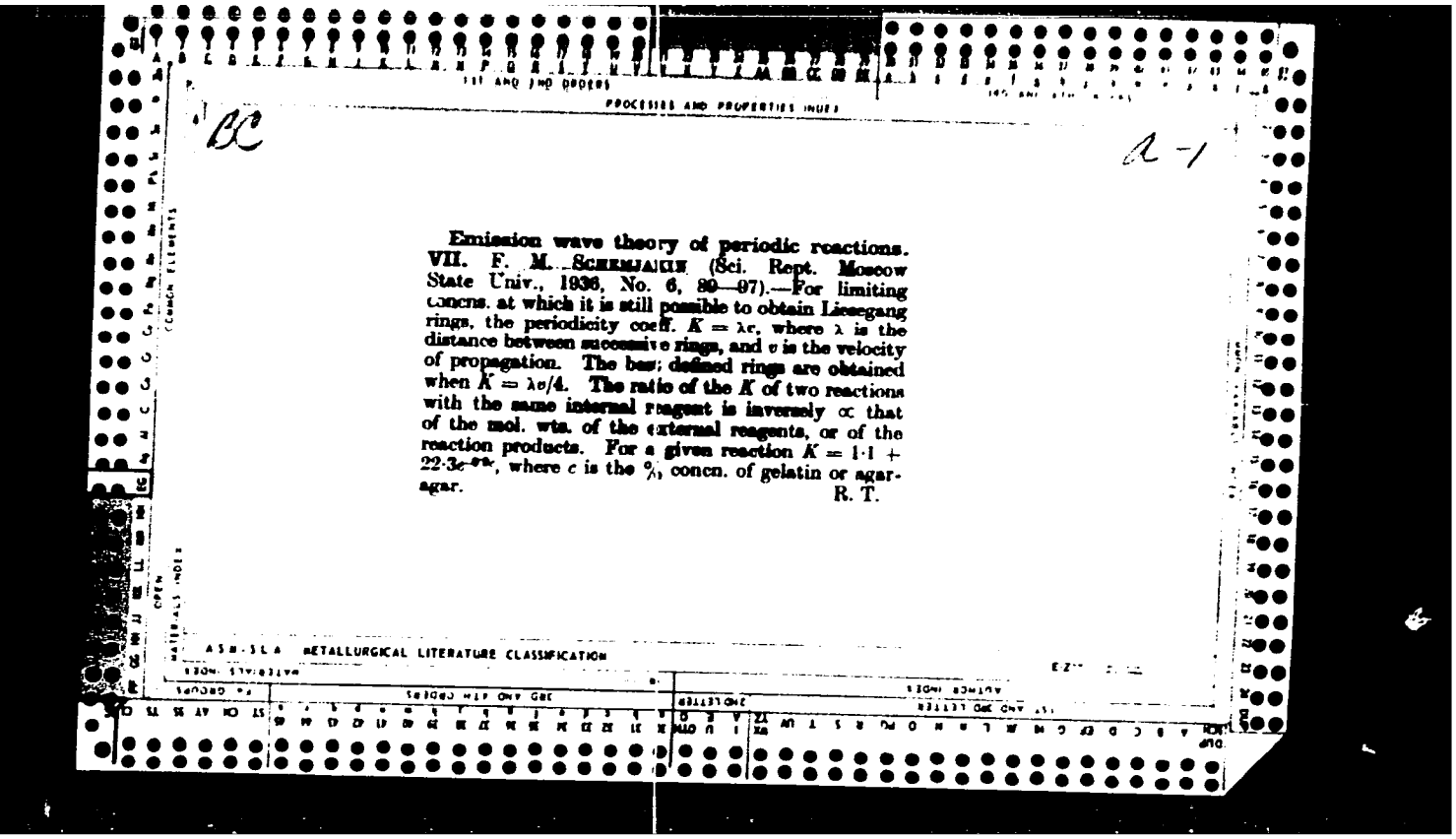


Gravimetric determination of vanadium and uranium by means of ammonium benzoate and salts of other organic acids. F. M. Shemyakin, V. V. Adamovitsch, and N. P. Pavlova (Zavod. Lab., 1936, 5, 1129—1131).—Aq. $(NH_4)_2S$ is added to 0·1 g. of NH_4VO_3 in 15 ml. of 0·6*N*-HCl, at the b.p., and 12 ml. of 8% NH_4 cinnamate are added. The ppt. of V^{IV} cinnamate is collected after 3—4 hr., washed with aq. cinnamic acid, ignited, and the residue of V_2O_5 is weighed. 4 pt. of 0·03*N*-NH_4OBz and 1 ml. of 10% aq. NH_3 are added per ml. of 0·05*N*-UO_2 salt (both solutions at the b.p.). The ppt. is collected, washed with 2% NH_4NO_3 (made alkaline with NH_3), and ignited, and the residue of U_3O_8 is weighed. Na_2CO_3 (>0·05*N*), Al, Cr, and Fe alums, $Th(NO_3)_4$, and Na_2HPO_4, but not $Ca(NO_3)_2$, interfere with determination of U by this method.

R. T.



BC

A-1

Emission wave theory of periodic reactions. VII. F. M. Scheremetkin (Sci. Rept. Moscow State Univ., 1936, No. 6, 89—97).—For limiting concns. at which it is still possible to obtain Liesegang rings, the periodicity coeff. $K = \lambda c$, where λ is the distance between successive rings, and v is the velocity of propagation. The best defined rings are obtained when $K = \lambda v/4$. The ratio of the K of two reactions with the same internal reagent is inversely ∝ that of the mol. wts. of the external reagents, or of the reaction products. For a given reaction $K = 1{\cdot}1 + 22{\cdot}3c^{-0.9c}$, where c is the %, concn. of gelatin or agar-agar.

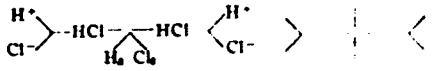
R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

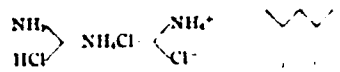
CA

2

Natural classification of chemical compounds. F. M. Shemyakin. *Ann. sector anal. phys.-chim., Inst. chim. gen.* (U. S. S. R.) 9, 49-54(1936); cf. *C. A.* 29, 4225⁵.—The basis of general classification of chem. units of different orders are the 2 operations of "stretch and shift." By the method of "Cayley square" (*Phil. Mag.* 13, 172 (1857); 18, 374(1859)), it is mathematically possible to formulate the tables of the 1st order, and from these by a shift to derive the tables of the 2nd (Wernerides) and 3rd orders. The tables of the 2nd order for the systems of liquid HF and NH_3 are shown. The theory of trees and invariants (Cayley, *loc. cit.*; Alekseev, *Z. phys. Chem.* 36, 740(1901)) applied to the progress of chem. processes in time gives results analogous to the spatial arrangement of atoms. Thus, the reaction between the mols. of H and Cl and the subsequent ionization of the HCl in time can be represented by a tree of the following structure:

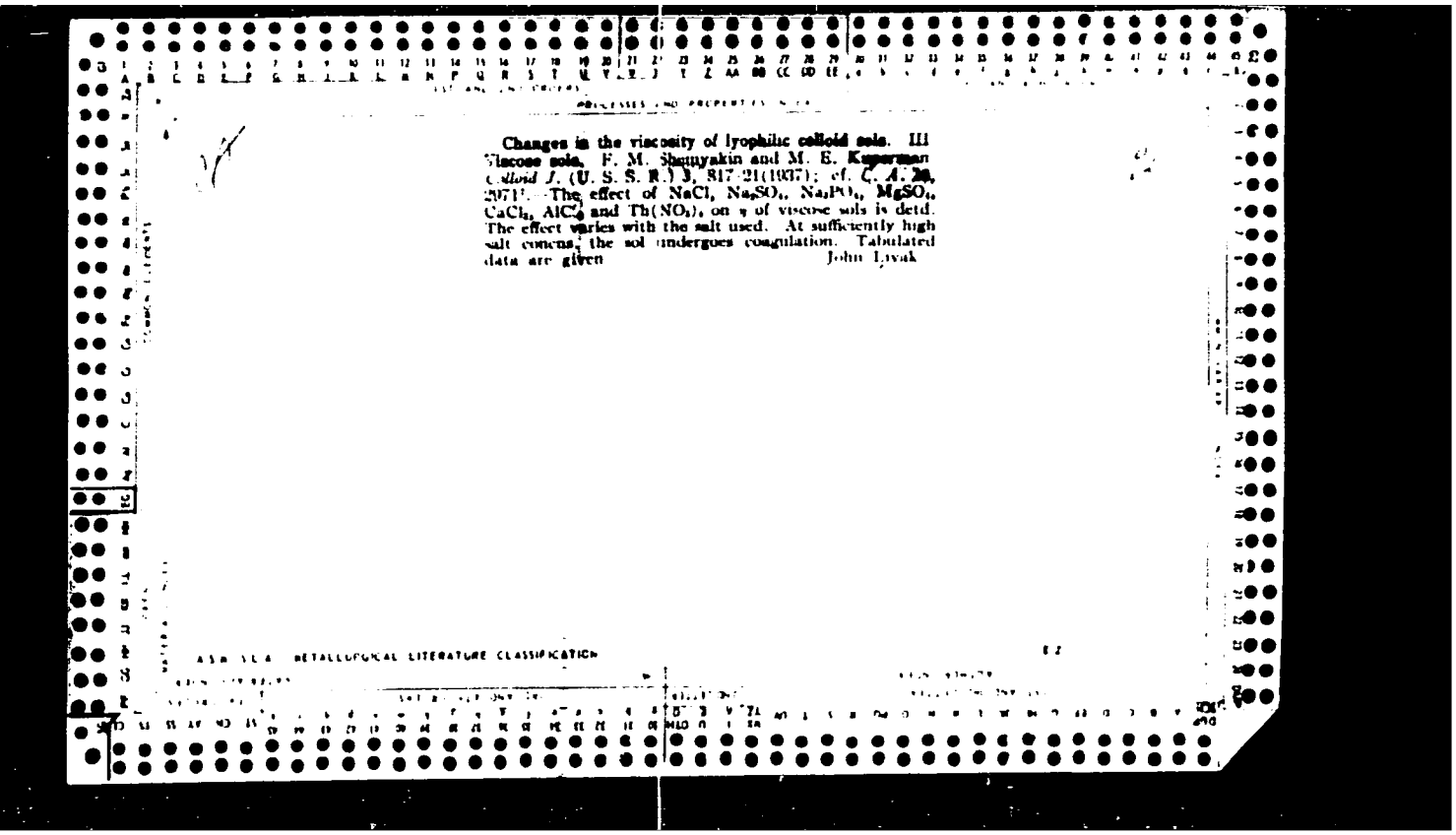


In the interaction of NH_3 with HCl the corresponding tree is:



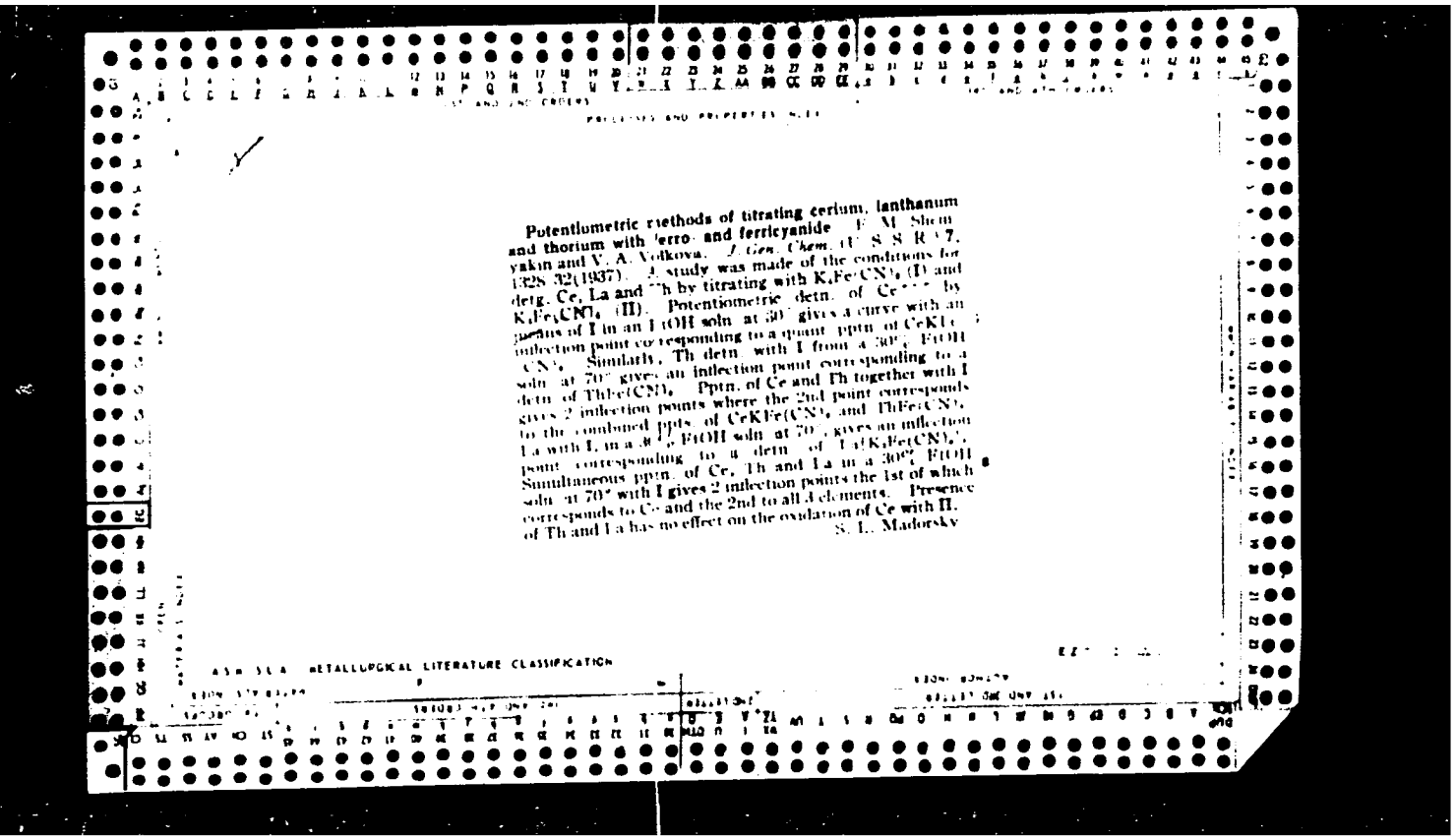
It follows that the resulting symbols represent sep. members of the normal geometrical series. Thus, reactions can also be classified according to the geometrical series, whereby sep. reactions are united into a single system. Therefore, the natural classification can be also extended to the chem. processes in time. Because of the analogy between the mols. and reactions, it is possible to speak of the reaction properties, such as the consts. of the rate of chem. reaction and the periodicity. About 20 references. Chas. Blanc

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION



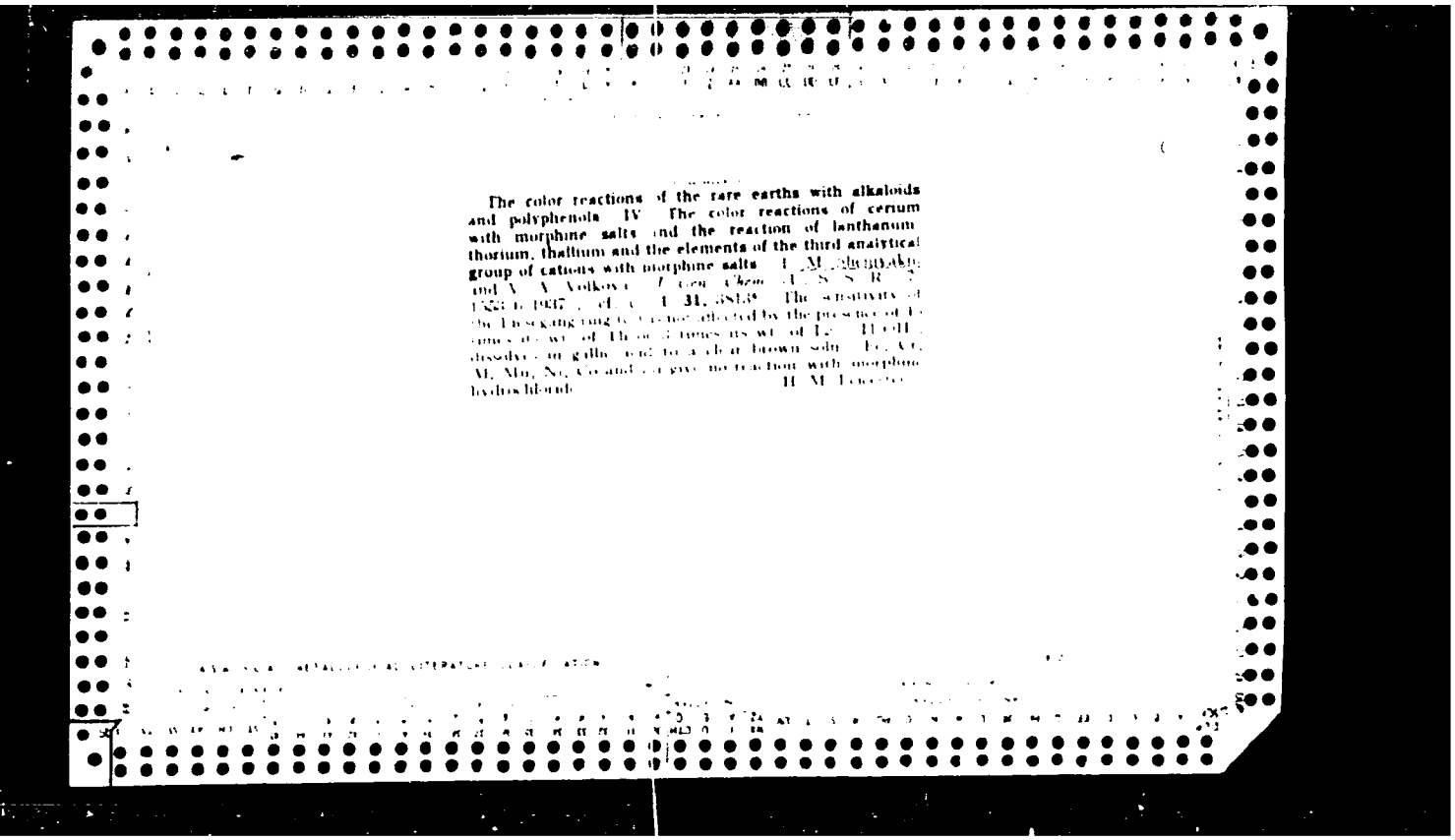
Changes in the viscosity of lyophilic colloid sols. III Glucose sols. F. M. Shemyakin and M. E. Kuperman *Colloid J.* (U. S. S. R.) 3, 817-21(1937); cf. *C. A.* **30**, 2071[1]. The effect of NaCl, Na_2SO_4, Na_3PO_4, $MgSO_4$, $CaCl_2$, $AlCl_3$ and $Th(NO_3)_4$ on η of viscose sols is detd. The effect varies with the salt used. At sufficiently high salt concns. the sol undergoes coagulation. Tabulated data are given. John Lyuk

ASM-WLA METALLURGICAL LITERATURE CLASSIFICATION

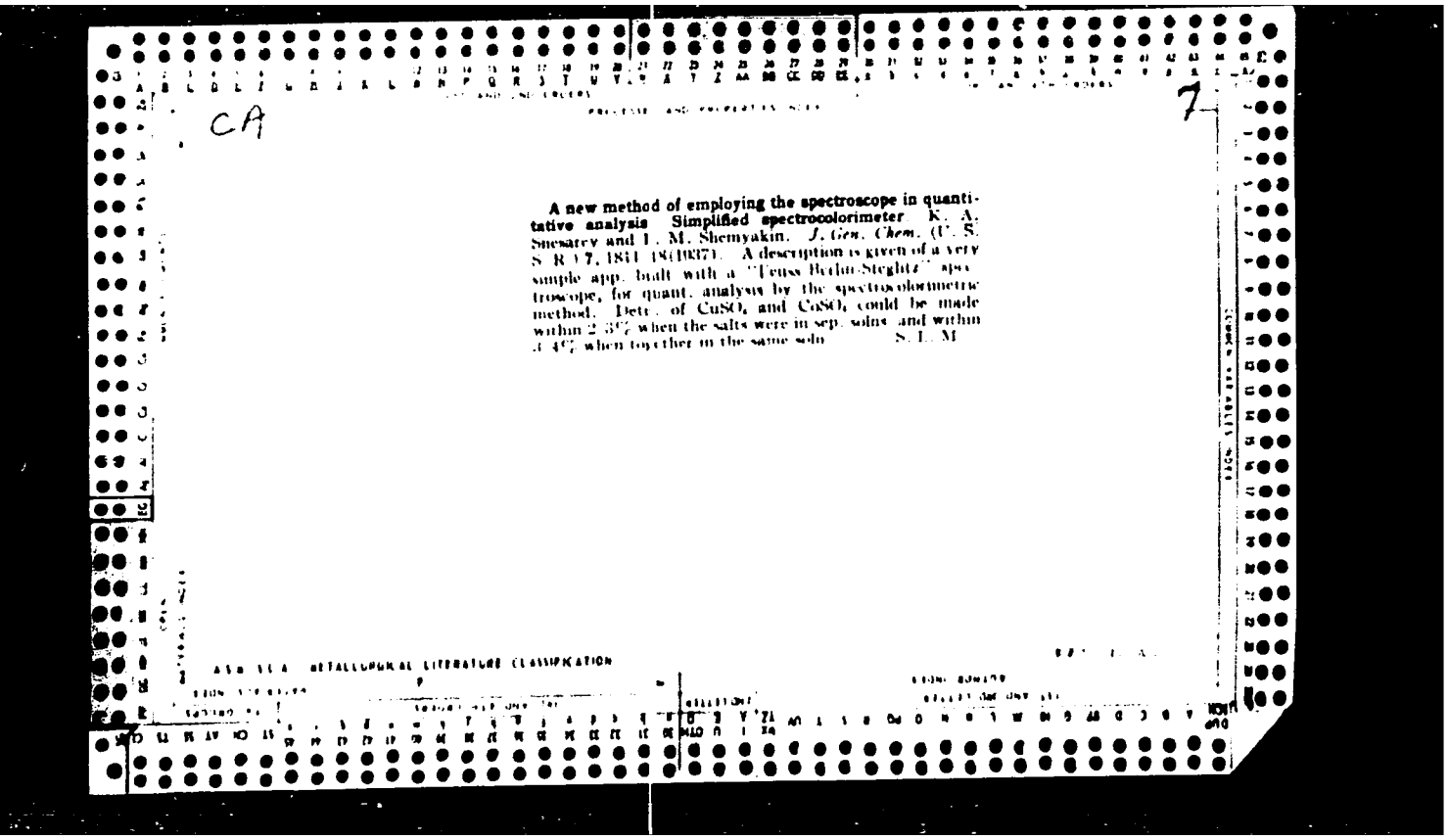


Potentiometric methods of titrating cerium, lanthanum and thorium with ferro- and ferricyanide I. M. Shemyakin and V. A. Volkova. *J. Gen. Chem.* (U.S.S.R.) 7, 1328-32(1937). A study was made of the conditions for detg. Ce, La and Th by titrating with $K_4Fe(CN)_6$ (I) and $K_3Fe(CN)_6$ (II). Potentiometric detn. of Ce^{+++} by means of I in an EtOH soln at 30° gives a curve with an inflection point corresponding to a quant. pptn. of $CeK[Fe(CN)_6]$. Similarly, Th detn. with I from a 30% EtOH soln at 70° gives an inflection point corresponding to a detn. of $ThFe(CN)_6$. Pptn. of Ce and Th together with I gives 2 inflection points where the 2nd point corresponds to the combined ppts. of $CeKFe(CN)_6$ and $ThFe(CN)_6$. La with I, in a 30% EtOH soln at 70°, gives an inflection point corresponding to a detn. of $La(K_4Fe(CN)_6)_3$. Simultaneous pptn. of Ce, Th and La in a 30% EtOH soln at 70° with I gives 2 inflection points the 1st of which corresponds to Ce and the 2nd to all 3 elements. Presence of Th and La has no effect on the oxidation of Ce with II.

S. L. Madorsky



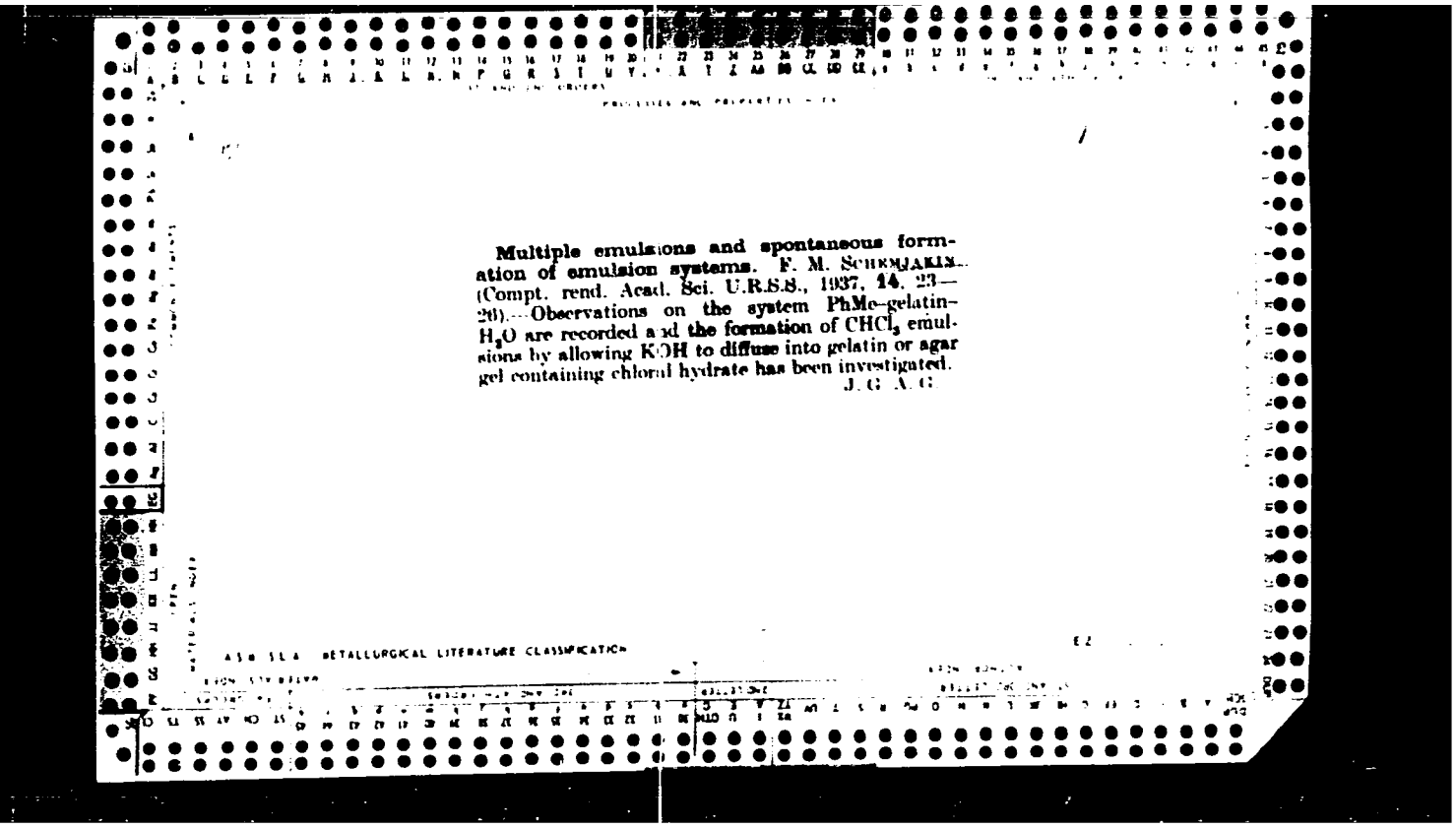
The color reactions of the rare earths with alkaloids and polyphenols IV The color reactions of cerium with morphine salts and the reaction of lanthanum thorium, thallium and the elements of the third analytical group of cations with morphine salts I M [illegible] and V A Volkova Zhur obshch Khim S S S R 1937 7 1847 cf C A 31, 8858 The sensitivity of the Ce-morphine ring reaction is not affected by the presence of La since the wt of Ce is 3 times as great as that of La Ce(OH) dissolves in gallic acid to a clear brown soln Fe Cu Al Mn Ni Co and Cr give no reaction with morphine hydrochloride H M Leicester



CA

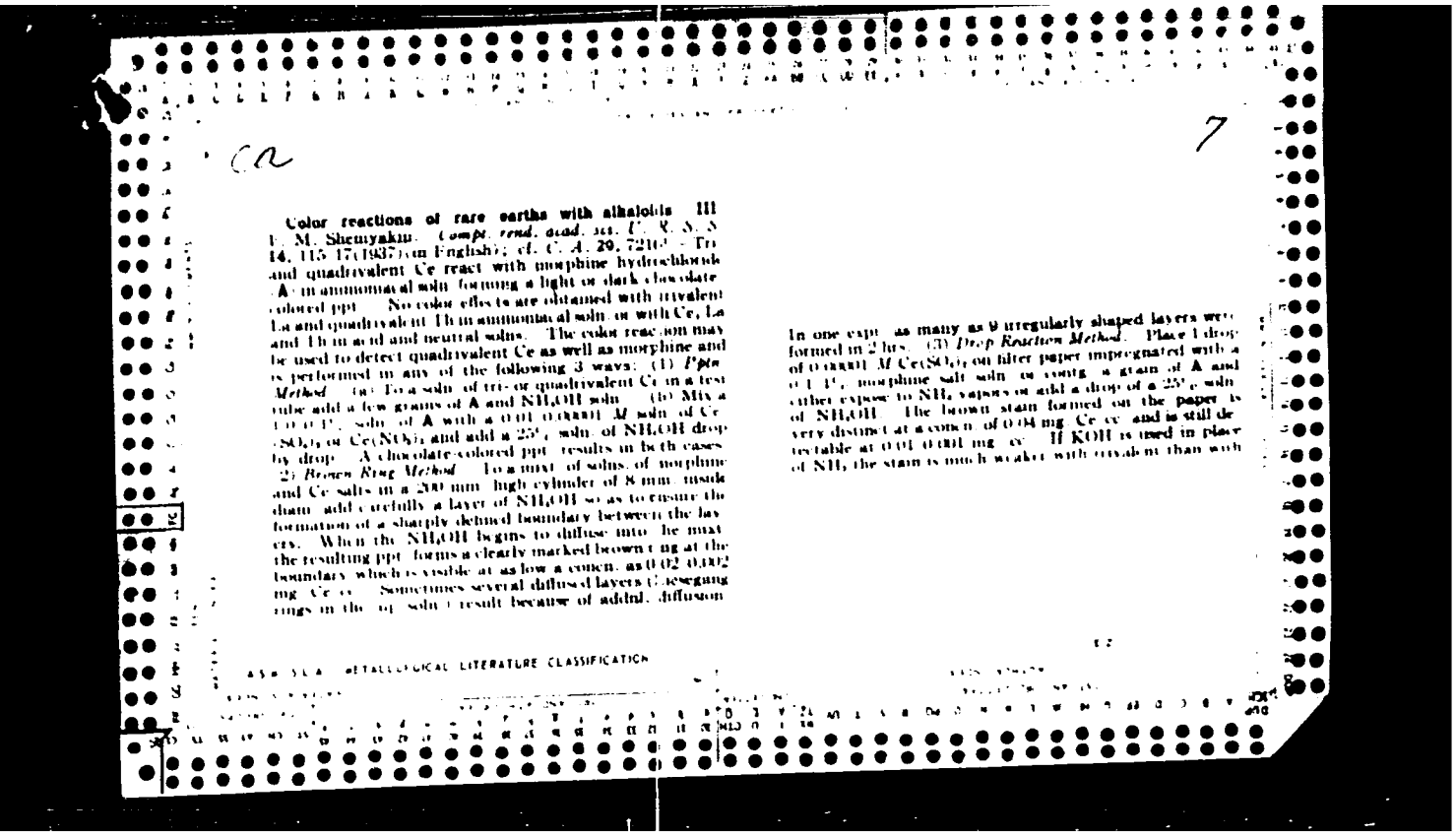
7

A new method of employing the spectroscope in quantitative analysis. Simplified spectrocolorimeter. K. A. Snesarev and I. M. Shemyakin. *J. Gen. Chem.* (U. S. S. R.) 7, 1811-18(1937). A description is given of a very simple app. built with a "Leuss Berlin-Steglitz" spectroscope, for quant. analysis by the spectrocolorimetric method. Detns. of $CuSO_4$ and $CoSO_4$ could be made within 2.5% when the salts were in sep. solns. and within 1.4% when together in the same soln. S. L. M.



Multiple emulsions and spontaneous formation of emulsion systems. F. M. SCHEREJAKIN. (Compt. rend. Acad. Sci. U.R.S.S., 1937, **14**, 23—26).—Observations on the system PhMe–gelatin–H_2O are recorded and the formation of $CHCl_3$ emulsions by allowing KOH to diffuse into gelatin or agar gel containing chloral hydrate has been investigated.

J. G. A. G.

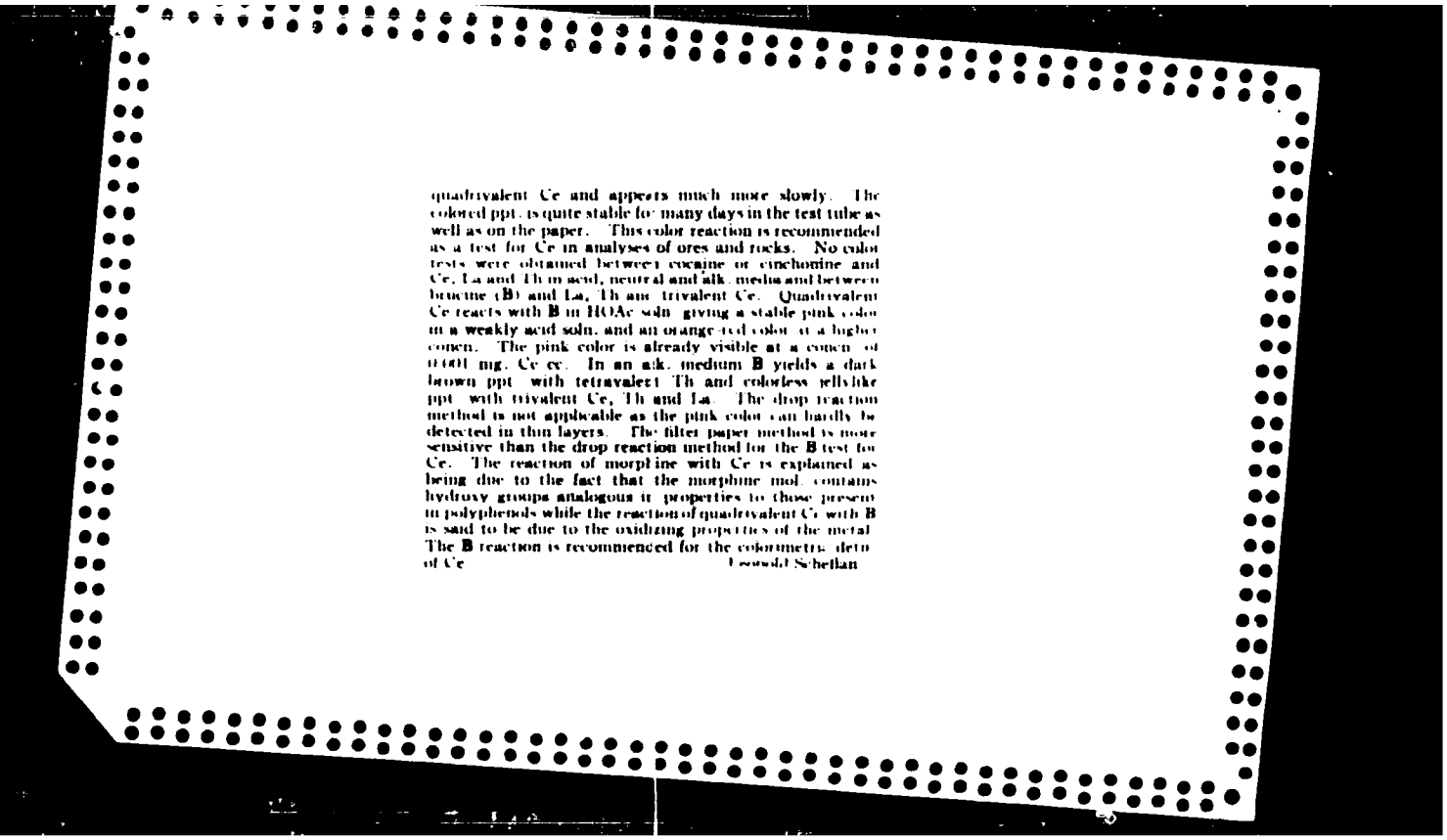


Ca

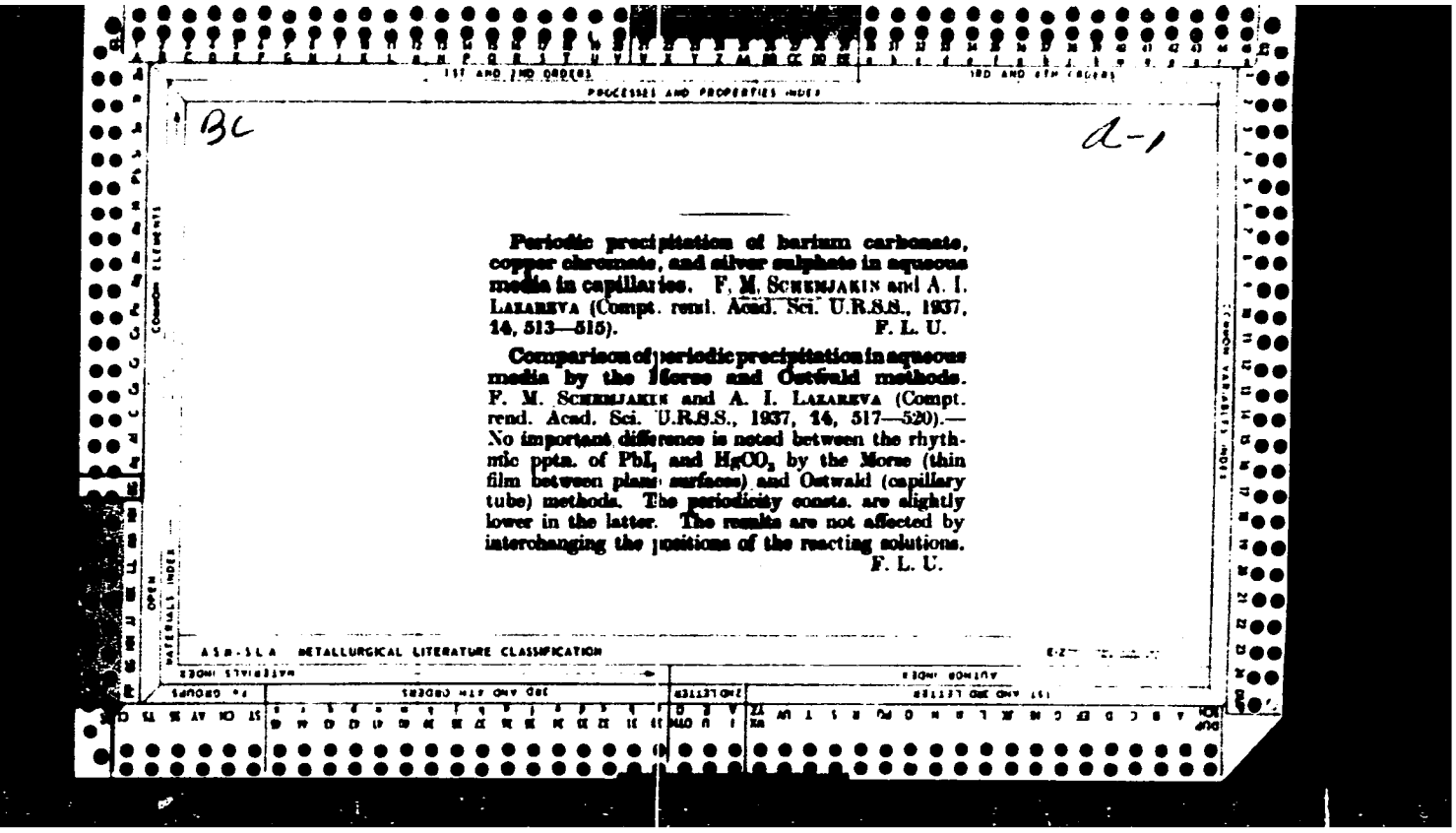
7

Color reactions of rare earths with alkaloids. III. V. M. Shemyakin. *Compt. rend. acad. sci. U. R. S. S.* 14, 115-17 (1937) (in English); cf. *C. A.* **29**, 7210[1]. — Tri- and quadrivalent Ce react with morphine hydrochloride. A m ammoniacal soln. forming a light or dark chocolate-colored ppt. No color effects are obtained with trivalent La and quadrivalent Th in ammoniacal solns. or with Ce, La and Th in acid and neutral solns. The color reaction may be used to detect quadrivalent Ce as well as morphine and is performed in any of the following 3 ways: (1) *Pipette Method.* (a) To a soln. of tri- or quadrivalent Ce in a test tube add a few grams of **A** and NH_4OH soln. (b) Mix a 1:0.0 [illegible] soln. of **A** with a 0.01 [illegible] *M* soln. of $Ce(SO_4)_2$ or $Ce(NO_3)_3$ and add a 25% soln. of NH_4OH drop by drop. A chocolate-colored ppt. results in both cases. (2) *Brown Ring Method.* To a mixt. of solns. of morphine and Ce salts in a 200 mm. high cylinder of 8 mm. inside diam. add carefully a layer of NH_4OH so as to ensure the formation of a sharply defined boundary between the layers. When the NH_4OH begins to diffuse into the mixt. the resulting ppt. forms a clearly marked brown ring at the boundary which is visible at as low a concn. as 0.02-0.002 mg. Ce/cc. Sometimes several diffused layers (converging rings in the upper soln.) result because of additl. diffusion. In one expt. as many as 9 irregularly shaped layers were formed in 2 hrs. (3) *Drop Reaction Method.* Place 1 drop of 0.01 [illegible] *M* $Ce(SO_4)_2$ on filter paper impregnated with a of 1% morphine salt soln. or contg. a grain of **A** and of 1% morphine salt soln. or contg. a grain of **A** and either expose to NH_3 vapors or add a drop of a 25% soln. of NH_4OH. The brown stain formed on the paper is very distinct at a concn. of 0.04 mg. Ce/cc. and is still detectable at 0.01-0.001 mg./cc. If KOH is used in place of NH_3 the stain is much weaker with trivalent than with

A 5 1 A METALLURGICAL LITERATURE CLASSIFICATION



quadrivalent Ce and appears much more slowly. The colored ppt. is quite stable for many days in the test tube as well as on the paper. This color reaction is recommended as a test for Ce in analyses of ores and rocks. No color tests were obtained between cocaine or cinchonine and Ce, La and Th in acid, neutral and alk. media and between brucine (B) and La, Th and trivalent Ce. Quadrivalent Ce reacts with B in HOAc soln. giving a stable pink color in a weakly acid soln. and an orange-red color at a higher concn. The pink color is already visible at a concn. of 0.001 mg. Ce/cc. In an alk. medium B yields a dark brown ppt. with tetravalent Th and colorless jellylike ppt. with trivalent Ce, Th and La. The drop reaction method is not applicable as the pink color can hardly be detected in thin layers. The filter paper method is more sensitive than the drop reaction method for the B test for Ce. The reaction of morphine with Ce is explained as being due to the fact that the morphine mol. contains hydroxy groups analogous in properties to those present in polyphenols while the reaction of quadrivalent Ce with B is said to be due to the oxidizing properties of the metal. The B reaction is recommended for the colorimetric detn. of Ce. — Oswald Schellan

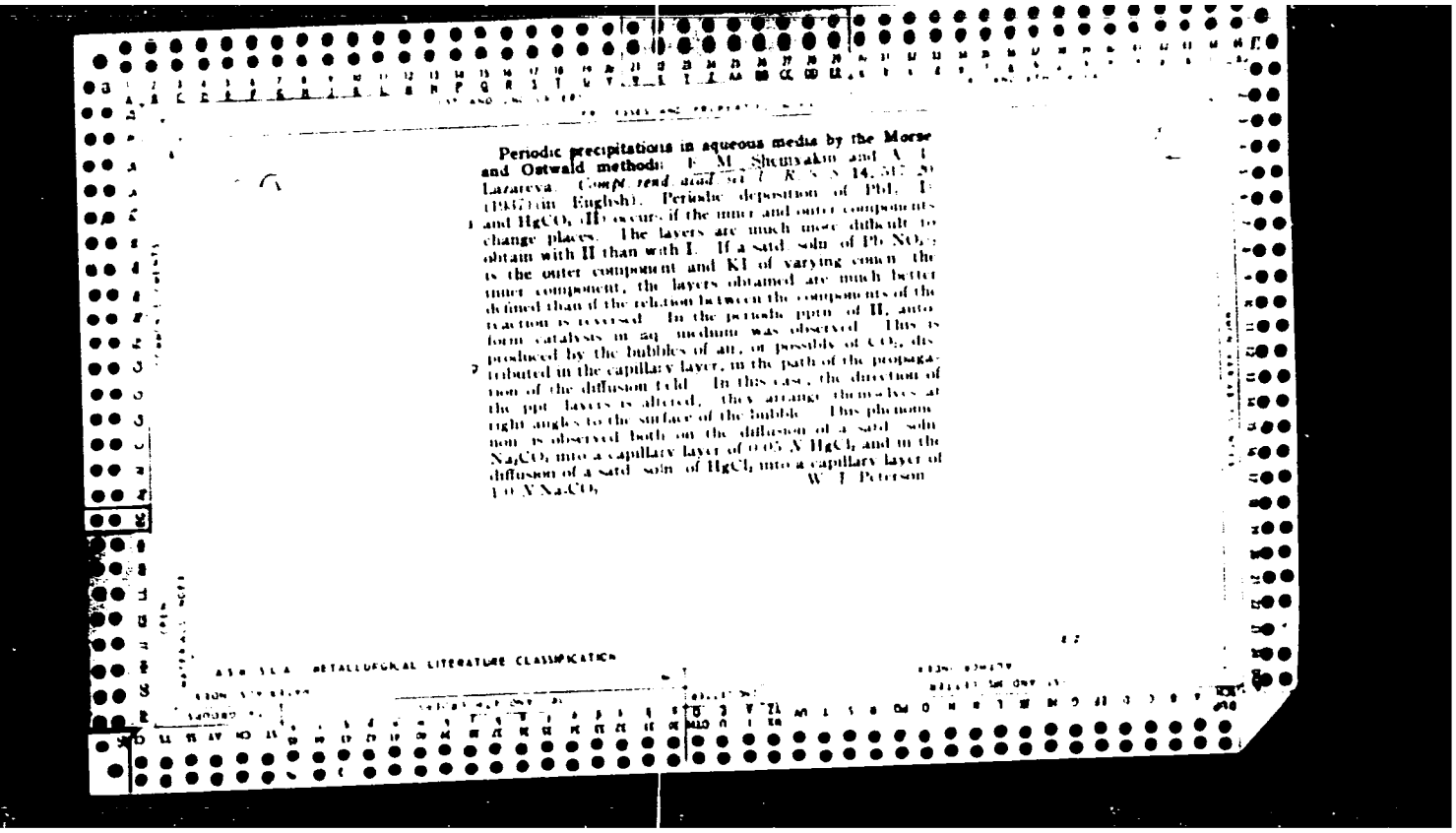


BC

A-1

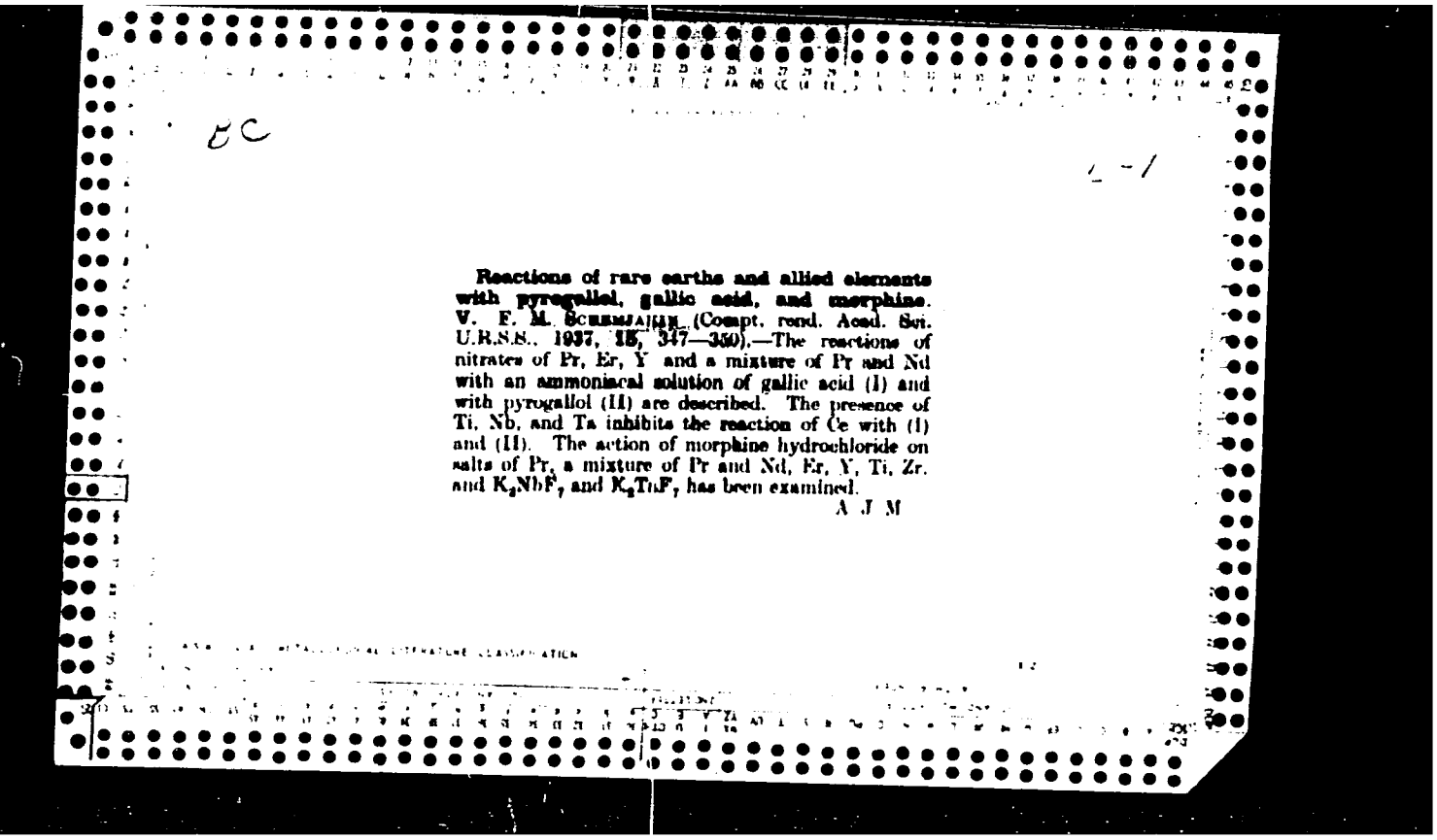
Periodic precipitation of barium carbonate, copper chromate, and silver sulphate in aqueous media in capillaries. F. M. SCHEMJAKIN and A. I. LAZAREVA (Compt. rend. Acad. Sci. U.R.S.S., 1937, 14, 513—515). F. L. U.

Comparison of periodic precipitation in aqueous media by the Morse and Ostwald methods. F. M. SCHEMJAKIN and A. I. LAZAREVA (Compt. rend. Acad. Sci. U.R.S.S., 1937, 14, 517—520).— No important difference is noted between the rhythmic ppta. of PbI_2 and $HgCO_3$ by the Morse (thin film between plane surfaces) and Ostwald (capillary tube) methods. The periodicity consts. are slightly lower in the latter. The results are not affected by interchanging the positions of the reacting solutions. F. L. U.



Periodic precipitations in aqueous media by the Morse and Ostwald methods. I. M. Shemyakin and A. I. Lazareva. *Compt. rend. acad. sci. U. R. S. S.* 14, 515–20 (1937) (in English). Periodic deposition of PbI$_2$ I (I) and HgCO$_3$ (II) occurs if the inner and outer components change places. The layers are much more difficult to obtain with II than with I. If a satd. soln. of Pb(NO$_3$)$_2$ is the outer component and KI of varying concn. the inner component, the layers obtained are much better defined than if the relation between the components of the reaction is reversed. In the periodic pptn. of II, auto-form catalysts in aq. medium was observed. This is produced by the bubbles of air, or possibly of CO$_2$, distributed in the capillary layer, in the path of the propagation of the diffusion field. In this case, the direction of the ppt. layers is altered, they arrange themselves at right angles to the surface of the bubble. This phenomenon is observed both on the diffusion of a satd. soln. Na_2CO_3 into a capillary layer of 0.05 *N* HgCl$_2$ and in the diffusion of a satd. soln. of HgCl$_2$ into a capillary layer of 1.0 *N* Na_2CO_3.

W. J. Peterson

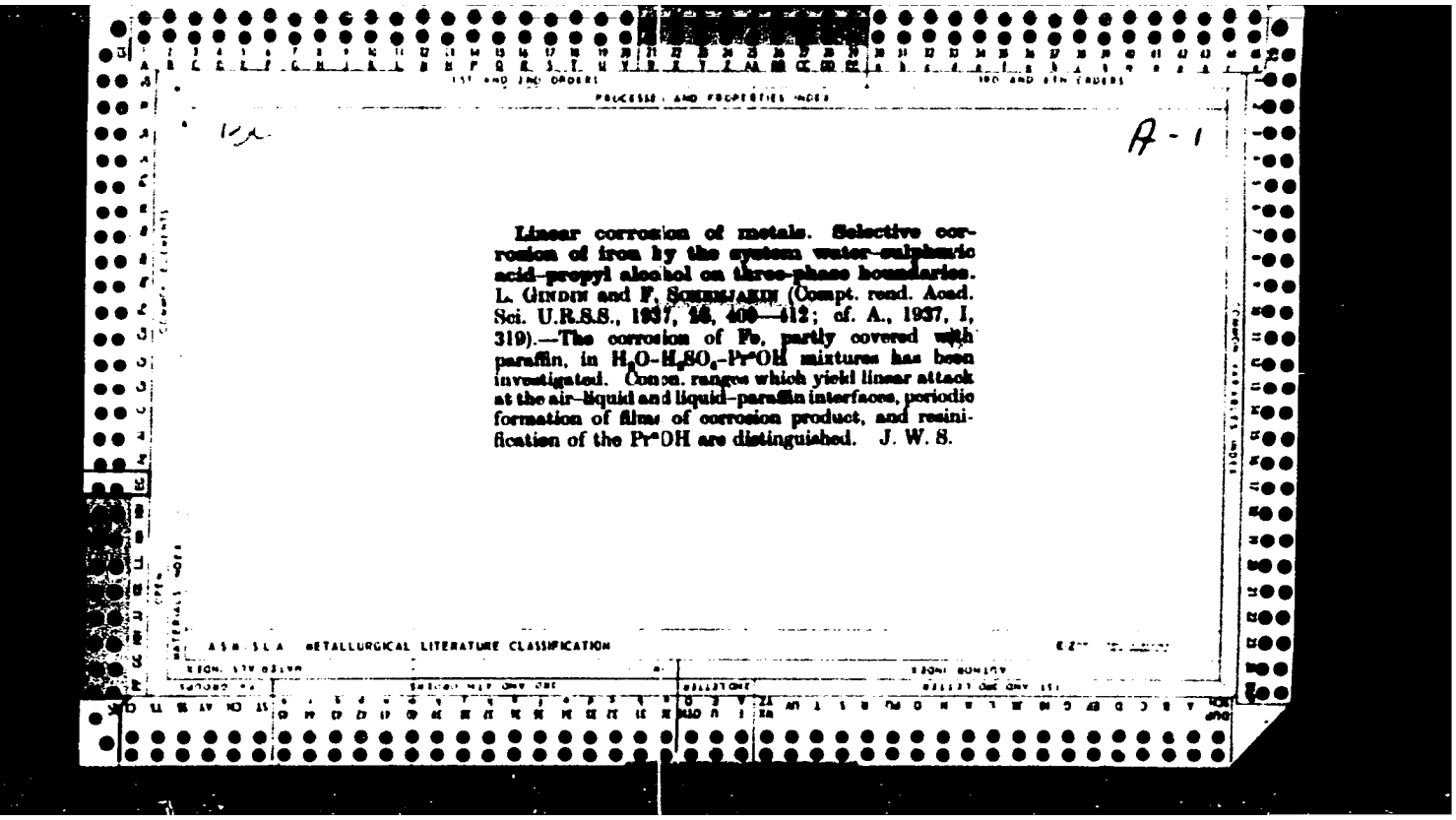


EC

4-1

Reactions of rare earths and allied elements with pyrogallol, gallic acid, and morphine. V. F. M. SCHEMJAKIN. (Compt. rend. Acad. Sci. U.R.S.S., 1937, 15, 347—350).—The reactions of nitrates of Pr, Er, Y and a mixture of Pr and Nd with an ammoniacal solution of gallic acid (I) and with pyrogallol (II) are described. The presence of Ti, Nb, and Ta inhibits the reaction of Ce with (I) and (II). The action of morphine hydrochloride on salts of Pr, a mixture of Pr and Nd, Er, Y, Ti, Zr, and K_2NbF_7 and K_2TiF_7 has been examined.

A. J. M.



PROCESSES AND PROPERTIES INDEX

A-1

Linear corrosion of metals. Selective corrosion of iron by the system water–sulphuric acid–propyl alcohol on three-phase boundaries. L. GINDIN and F. SCHMIDASH (Compt. rend. Acad. Sci. U.R.S.S., 1937, 16, 409—412; cf. A., 1937, I, 319).—The corrosion of Fe, partly covered with paraffin, in H_2O–H_2SO_4–$Pr^{\alpha}OH$ mixtures has been investigated. Concn. ranges which yield linear attack at the air–liquid and liquid–paraffin interfaces, periodic formation of films of corrosion product, and resinification of the $Pr^{\alpha}OH$ are distinguished. J. W. S.

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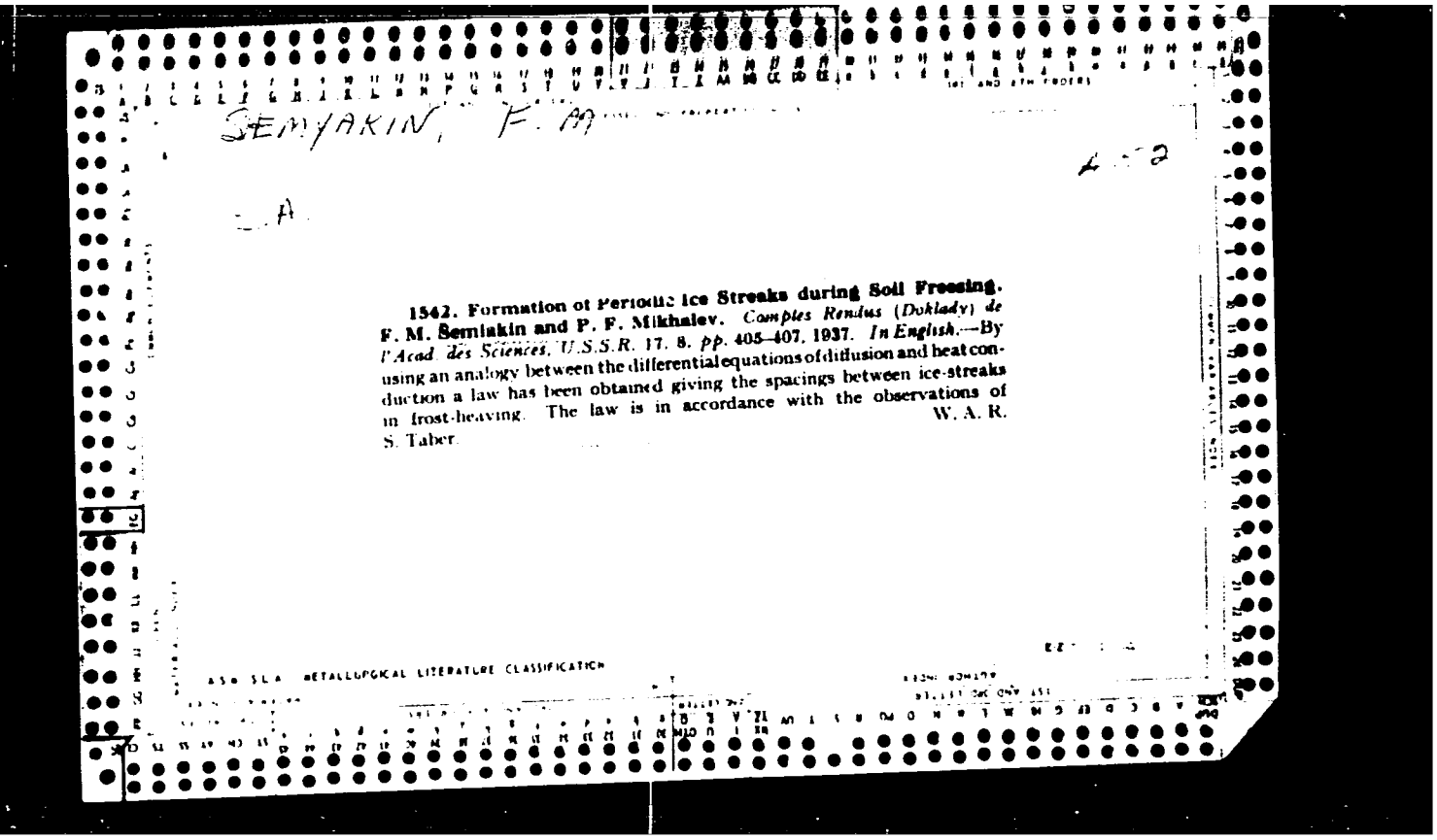

SEMYAKIN, F. M.

A-2

1542. **Formation of Periodic Ice Streaks during Soil Freezing.** F. M. Semiakin and P. F. Mikhaiev. *Comptes Rendus (Doklady) de l'Acad. des Sciences, U.S.S.R.* 17. 8. *pp.* 405–407. 1937. *In English.*—By using an analogy between the differential equations of diffusion and heat conduction a law has been obtained giving the spacings between ice-streaks in frost-heaving. The law is in accordance with the observations of W. A. R. S. Taber.

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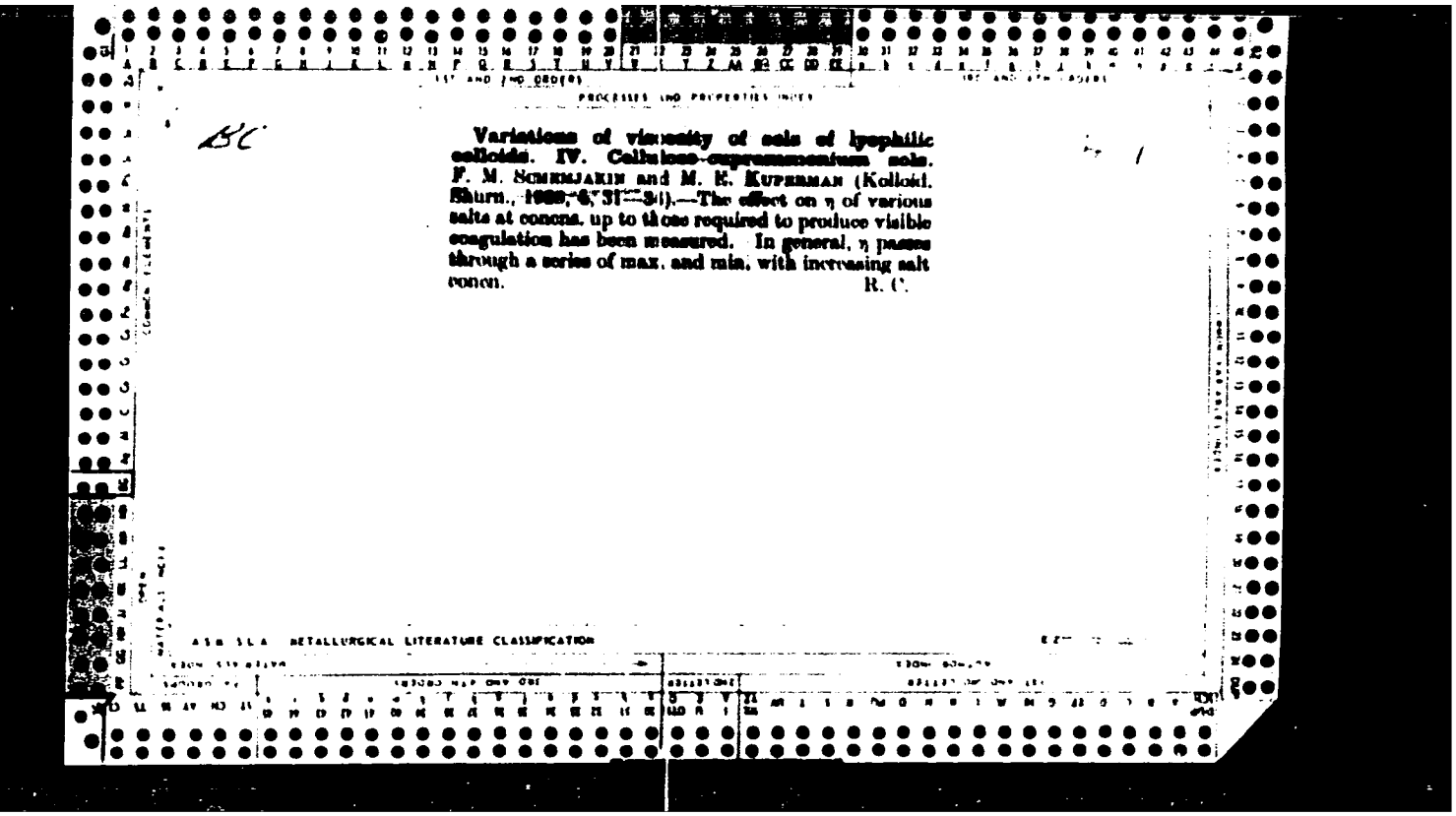
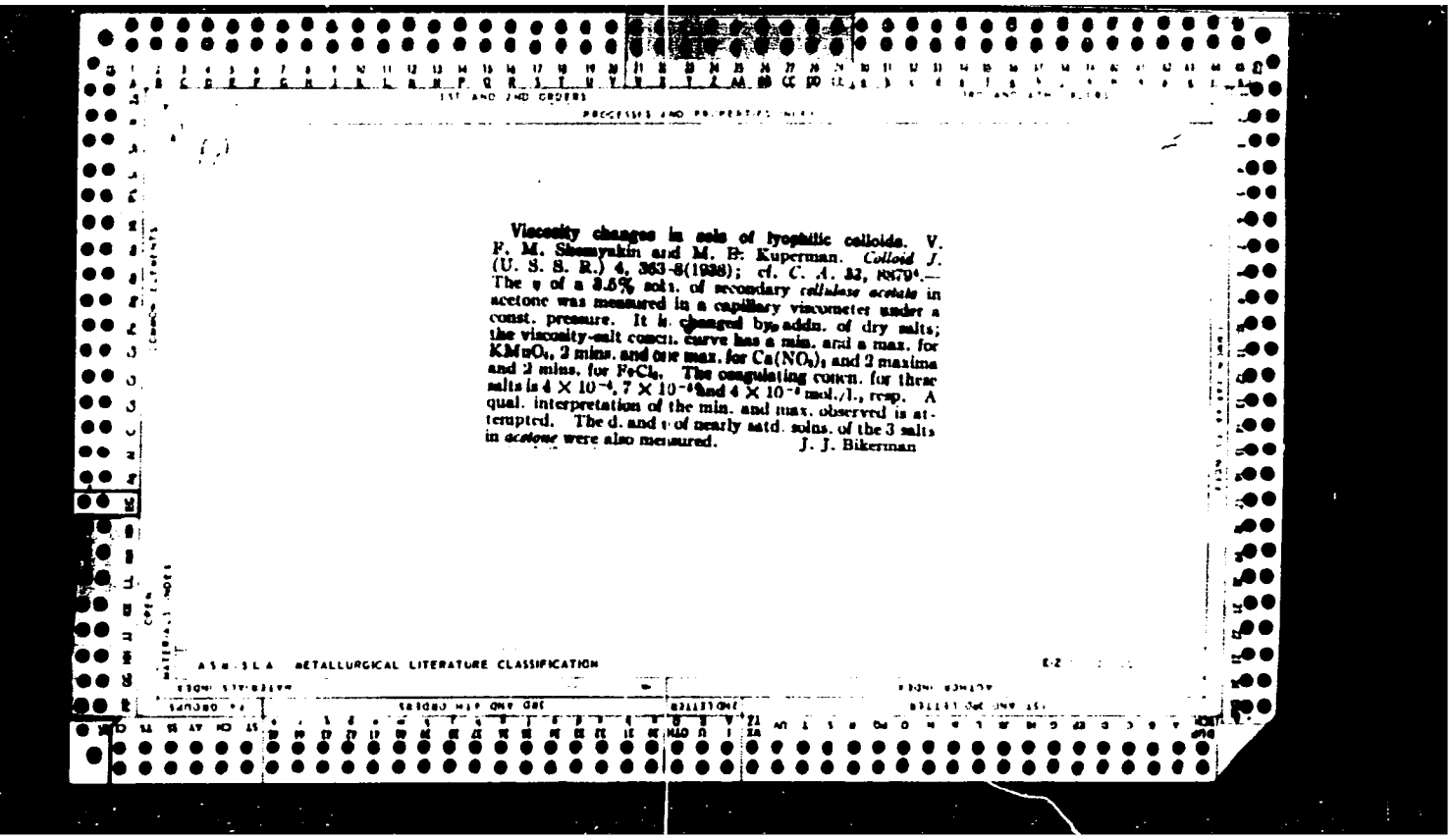


BC

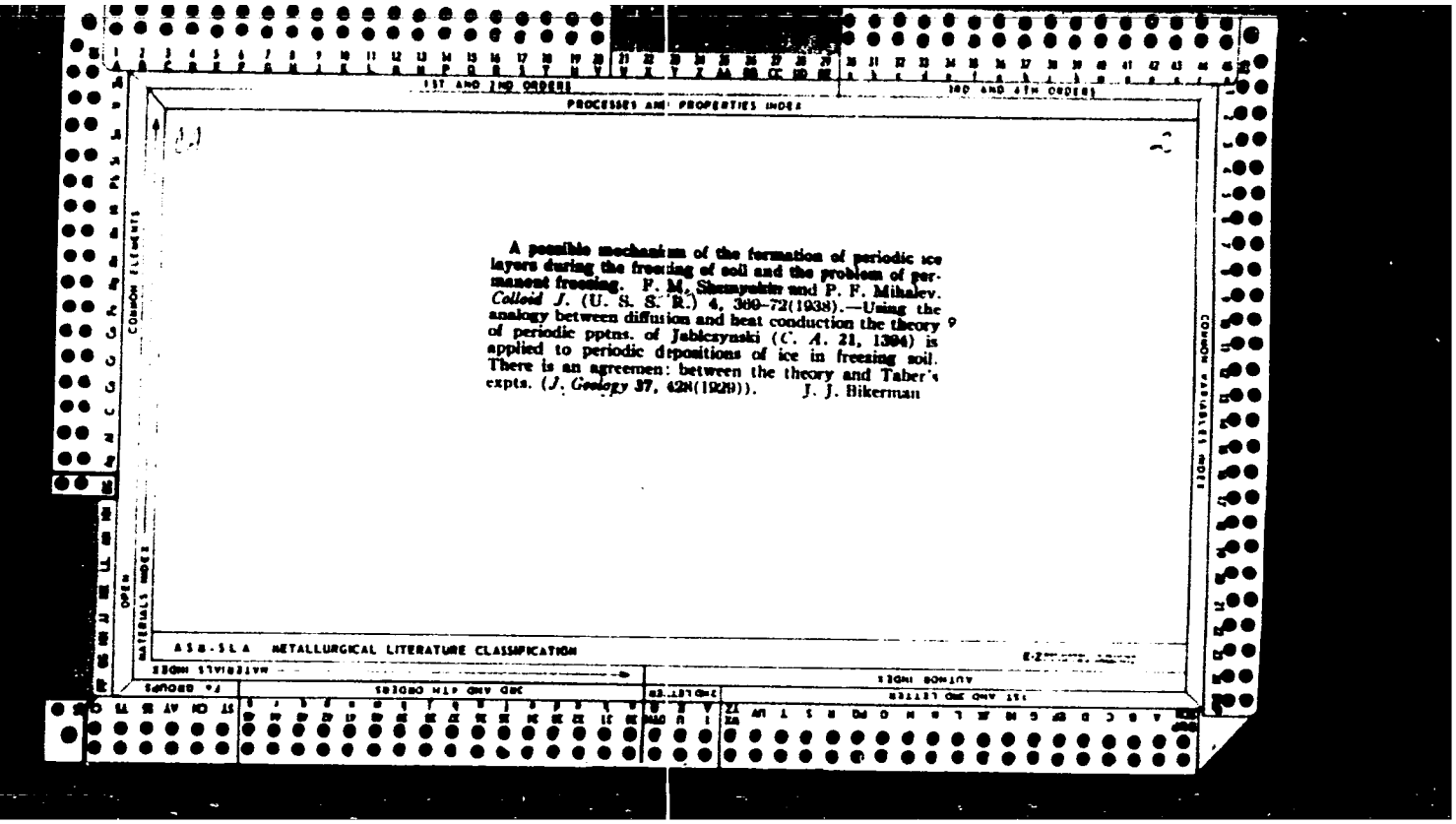
Variations of viscosity of sols of lyophilic colloids. IV. Cellulose-cuprammonium sols. F. M. SCHMIDJAKIN and M. E. KUPERMAN (Kolloid. Shurn., 1939, 6, 31—34).—The effect on η of various salts at concns. up to those required to produce visible coagulation has been measured. In general, η passes through a series of max. and min. with increasing salt concn.

R. C.

A 1 a S L A METALLURGICAL LITERATURE CLASSIFICATION



Viscosity changes in sols of lyophilic colloids. V. F. M. Shemyukin and M. B. Kuperman. *Colloid J.* (U. S. S. R.) 4, 363-8(1938); cf. *C. A.* 32, 8879⁶.—The η of a 3.5% sols. of secondary *cellulose acetate* in acetone was measured in a capillary viscometer under a const. pressure. It is changed by addn. of dry salts; the viscosity-salt concn. curve has a min. and a max. for $KMnO_4$, 2 mins. and one max. for $Ca(NO_3)_2$ and 2 maxima and 2 mins. for $FeCl_3$. The congulating concn. for these salts is 4×10^{-4}, 7×10^{-4} and 4×10^{-4} mol./l., resp. A qual. interpretation of the min. and max. observed is attempted. The d. and η of nearly satd. solns. of the 3 salts in *acetone* were also measured. J. J. Bikerman



PROCESSES AND PROPERTIES INDEX

A possible mechanism of the formation of periodic ice layers during the freezing of soil and the problem of permanent freezing. F. M. Shemyakin and P. F. Mikhalev. *Colloid J.* (U. S. S. R.) 4, 369–72(1938).—Using the analogy between diffusion and heat conduction the theory of periodic pptns. of Jablczynski (*C. A.* 21, 1304) is applied to periodic depositions of ice in freezing soil. There is an agreemen: between the theory and Taber's expts. (*J. Geology* 37, 428(1929)). J. J. Bikerman

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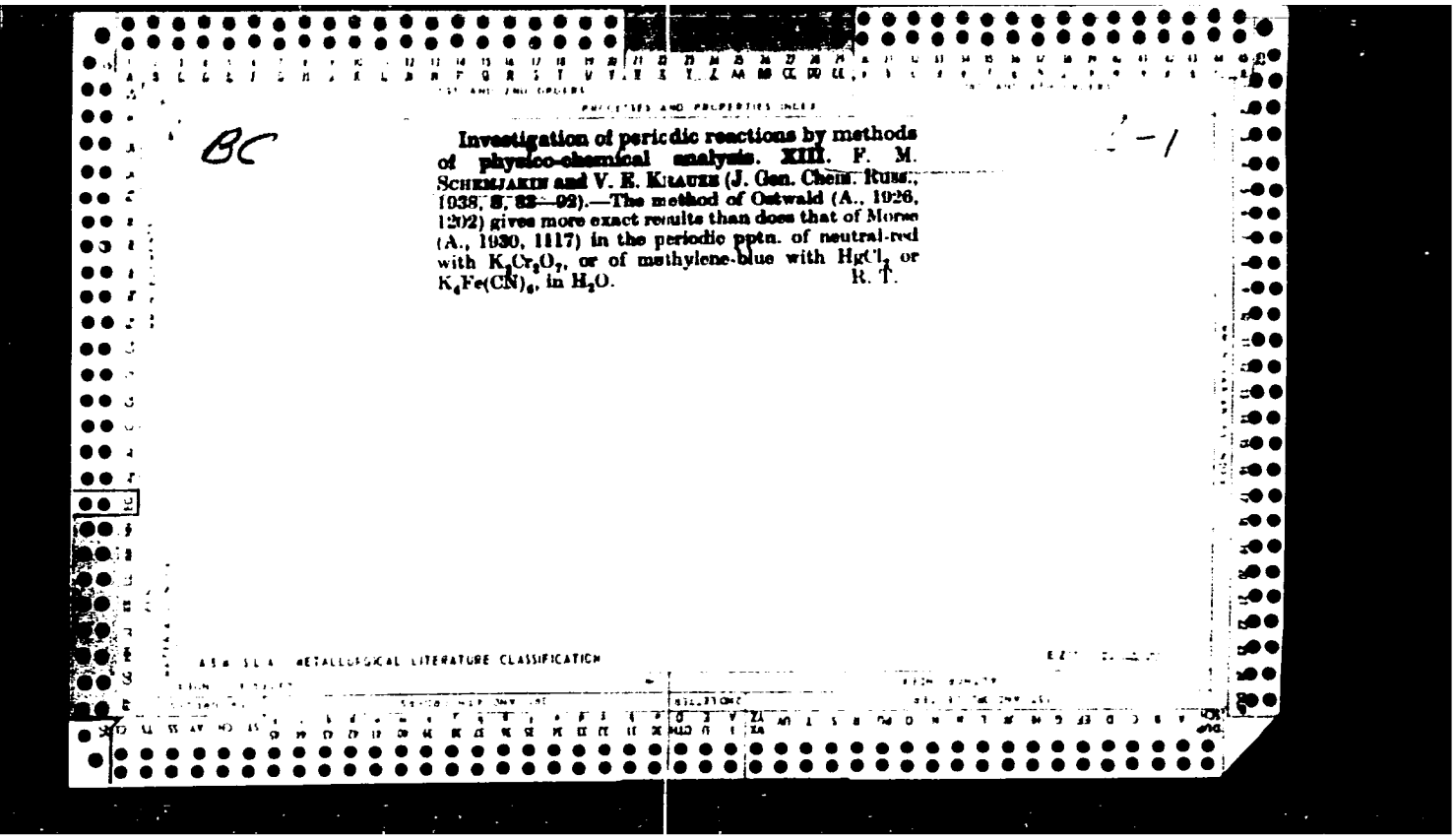
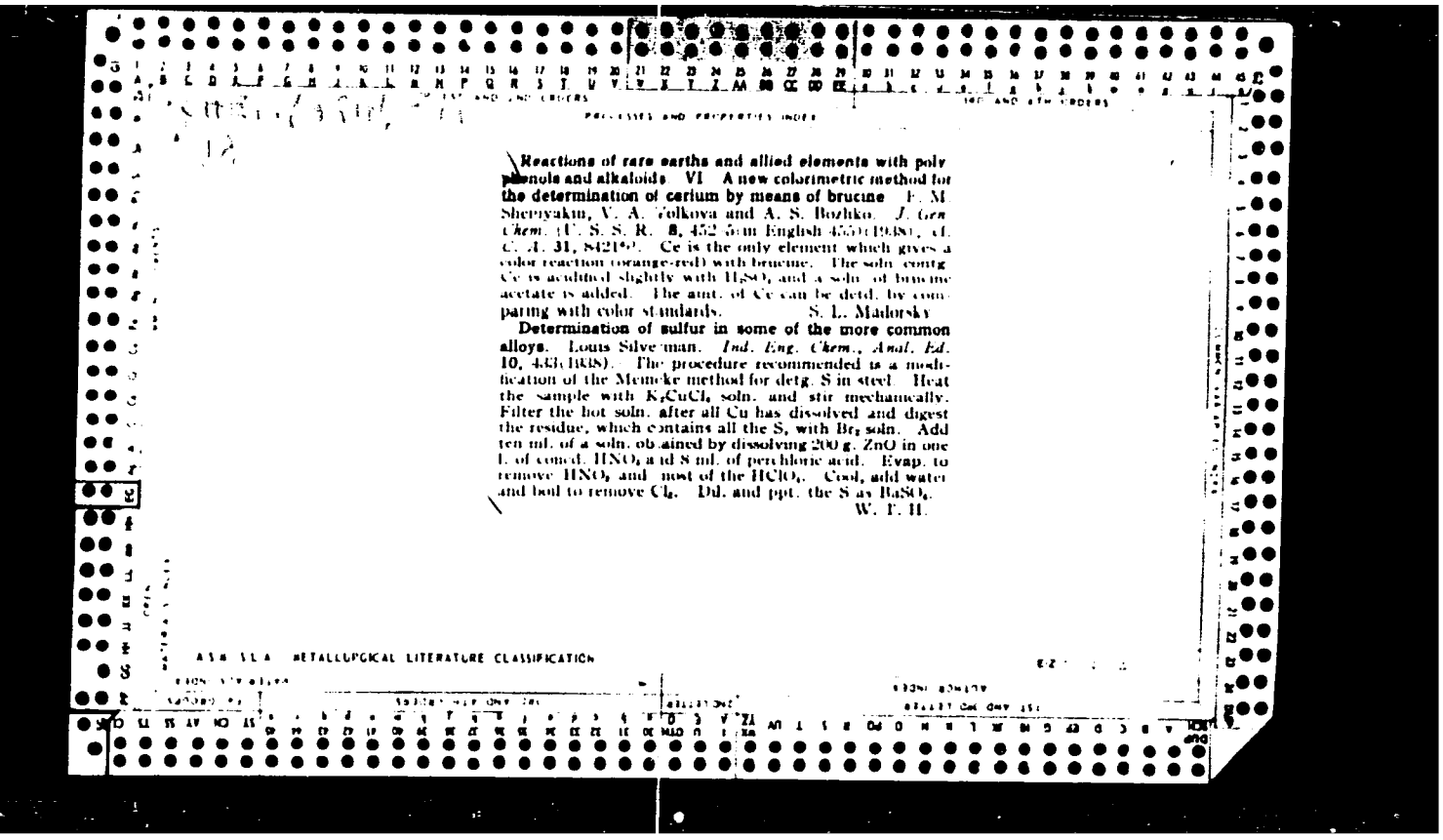


BC

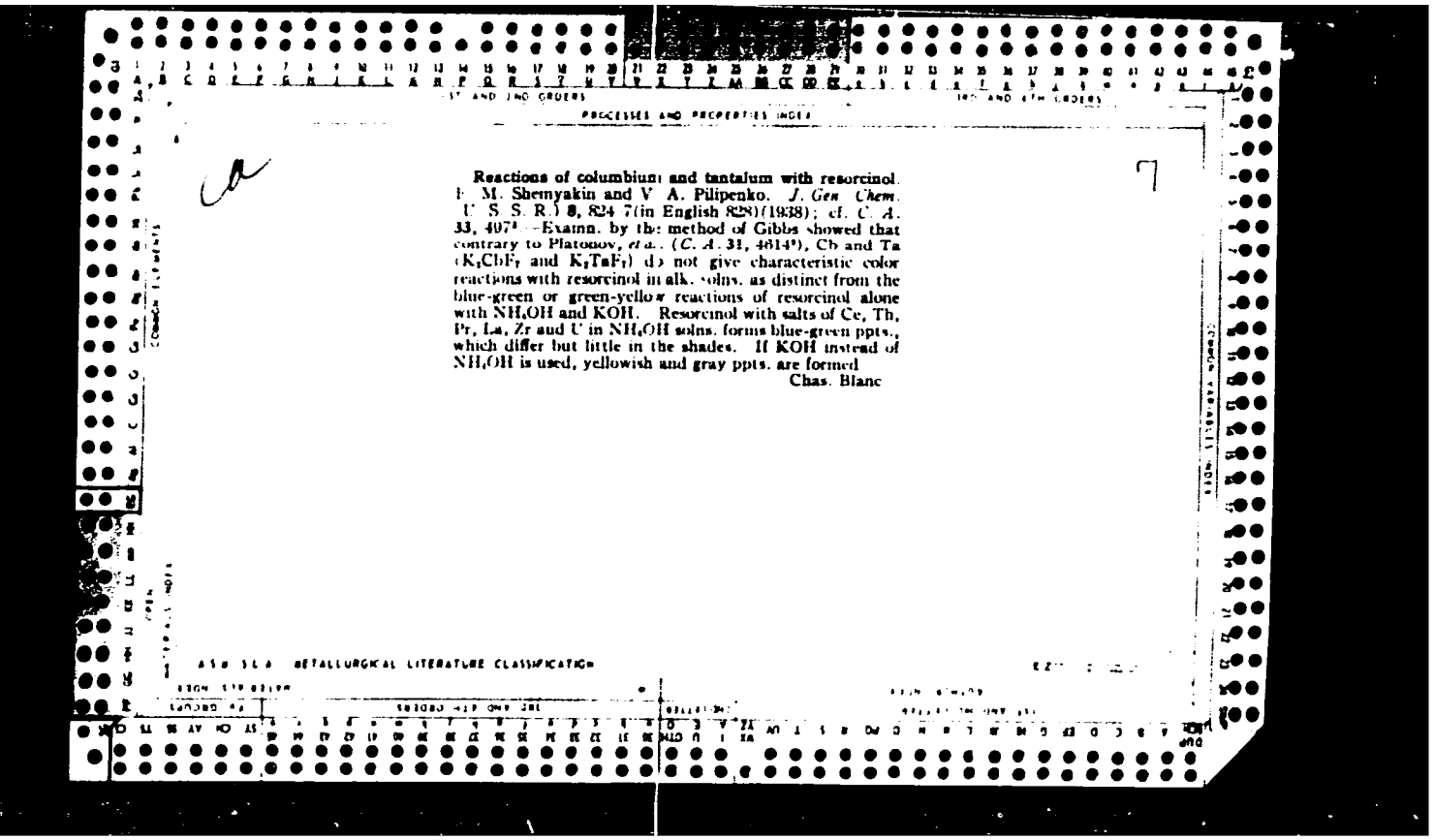
Investigation of periodic reactions by methods of physico-chemical analysis. XIII. F. M. SCHEMJAKIN and V. E. KRAUSE (J. Gen. Chem. Russ., 1938, 8, 83—92).—The method of Ostwald (A., 1926, 1202) gives more exact results than does that of Morse (A., 1930, 1117) in the periodic pptn. of neutral-red with $K_2Cr_2O_7$, or of methylene-blue with $HgCl_2$ or $K_4Fe(CN)_6$, in H_2O. R. T.

METALLURGICAL LITERATURE CLASSIFICATION



Reactions of rare earths and allied elements with polyphenols and alkaloids. VI. A new colorimetric method for the determination of cerium by means of brucine. F. M. Shemyakin, V. A. Volkova and A. S. Bozhko. *J. Gen. Chem.* (U. S. S. R.) **8**, 452-5 (in English 455) (1938); cf. *C. A.* **31**, 8421[9]. Ce is the only element which gives a color reaction (orange-red) with brucine. The soln. contg. Ce is acidified slightly with H_2SO_4 and a soln. of brucine acetate is added. The amt. of Ce can be detd. by comparing with color standards. S. L. Madorsky

Determination of sulfur in some of the more common alloys. Louis Silverman. *Ind. Eng. Chem., Anal. Ed.* **10**, 443 (1938). The procedure recommended is a modification of the Memeke method for detg. S in steel. Heat the sample with K_2CuCl_4 soln. and stir mechanically. Filter the hot soln. after all Cu has dissolved and digest the residue, which contains all the S, with Br_2 soln. Add ten ml. of a soln. obtained by dissolving 200 g. ZnO in one l. of concd. HNO_3 and 8 ml. of perchloric acid. Evap. to remove HNO_3 and most of the $HClO_4$. Cool, add water and boil to remove Cl_2. Dil. and ppt. the S as $BaSO_4$. W. F. H.

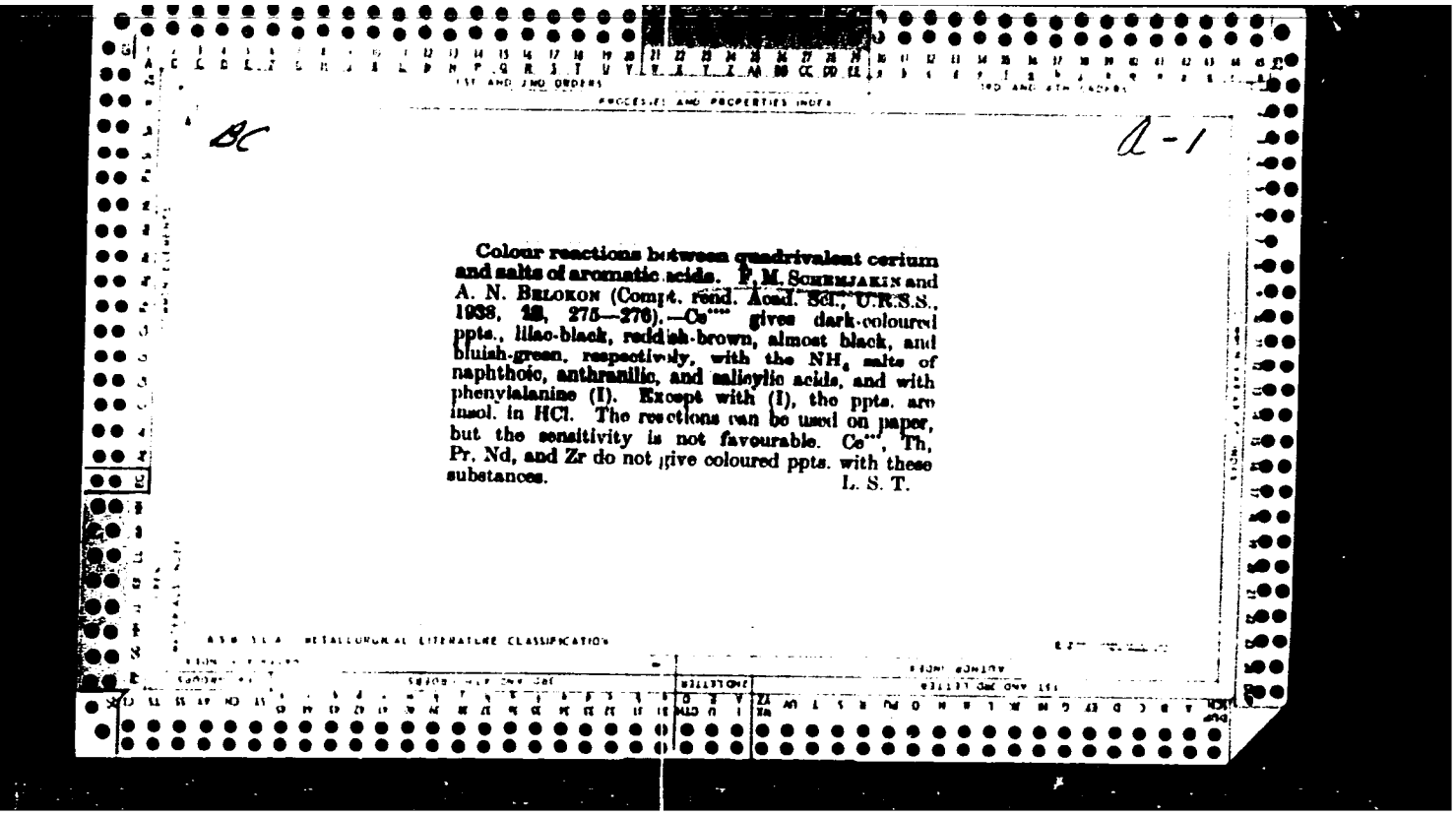


PROCESSES AND PROPERTIES INDEX

Reactions of columbium and tantalum with resorcinol. P. M. Shemyakin and V. A. Pilipenko. *J. Gen. Chem. (U. S. S. R.)* **8**, 824-7(in English 828)(1938); cf. *C. A.* 33, 4077.—Examn. by the method of Gibbs showed that contrary to Platonov, *et al.* (*C. A.* 31, 4614⁹), Cb and Ta (K_2CbF_7 and K_2TaF_7) do not give characteristic color reactions with resorcinol in alk. solns. as distinct from the blue-green or green-yellow reactions of resorcinol alone with NH_4OH and KOH. Resorcinol with salts of Ce, Th, Pr, La, Zr and U in NH_4OH solns. forms blue-green ppts., which differ but little in the shades. If KOH instead of NH_4OH is used, yellowish and gray ppts. are formed.

Chas. Blanc

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION



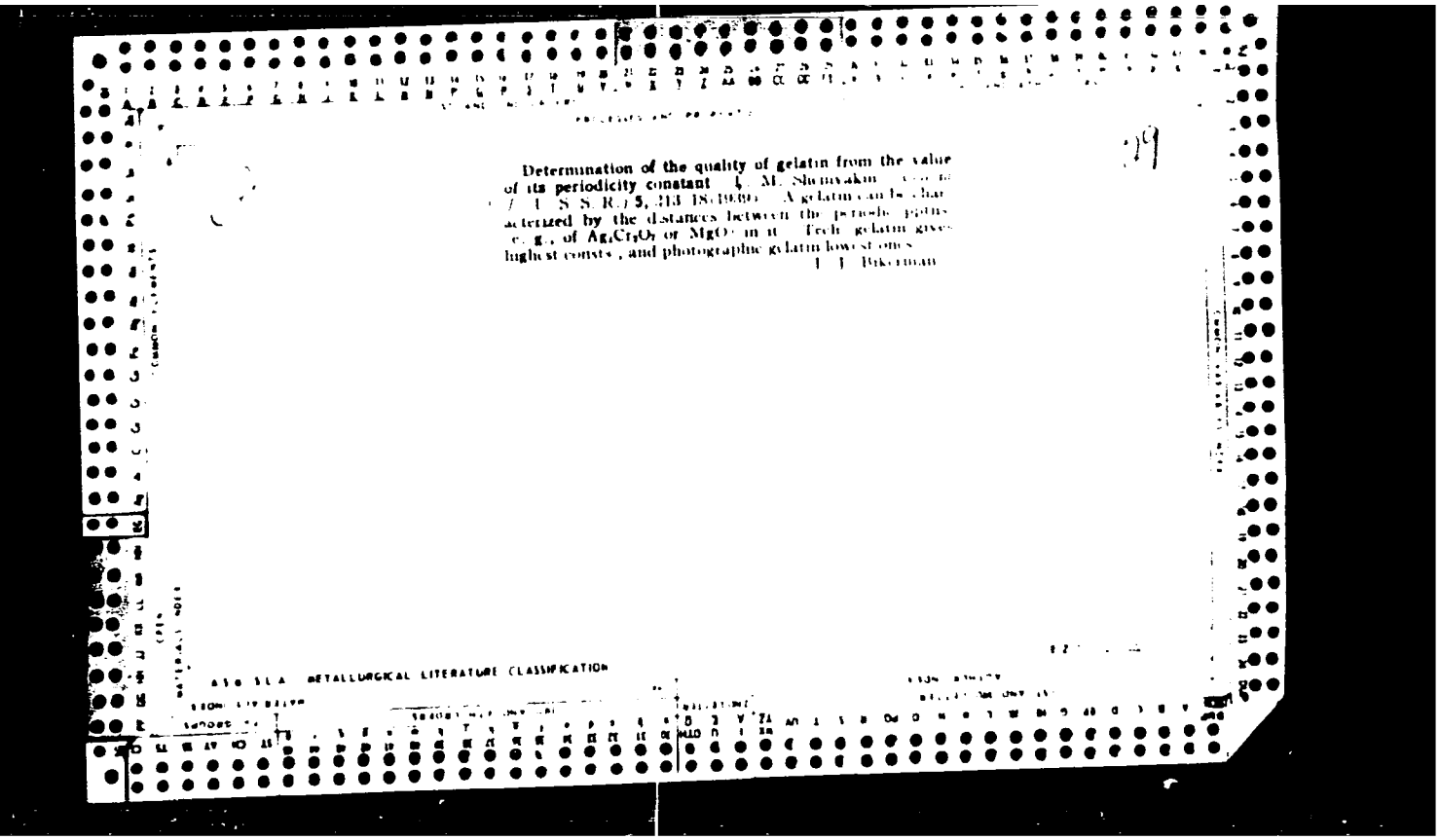
Colour reactions between quadrivalent cerium and salts of aromatic acids. F. M. Schemjakin and A. N. Belokon (Compt. rend. Acad. Sci., U.R.S.S., 1938, 18, 275—276).—Ce^{++++} gives dark-coloured ppts., lilac-black, reddish-brown, almost black, and bluish-green, respectively, with the NH_4 salts of naphthoic, anthranilic, and salicylic acids, and with phenylalanine (I). Except with (I), the ppts. are insol. in HCl. The reactions can be used on paper, but the sensitivity is not favourable. Ce^{+++}, Th, Pr, Nd, and Zr do not give coloured ppts. with these substances.

L. S. T.

BC

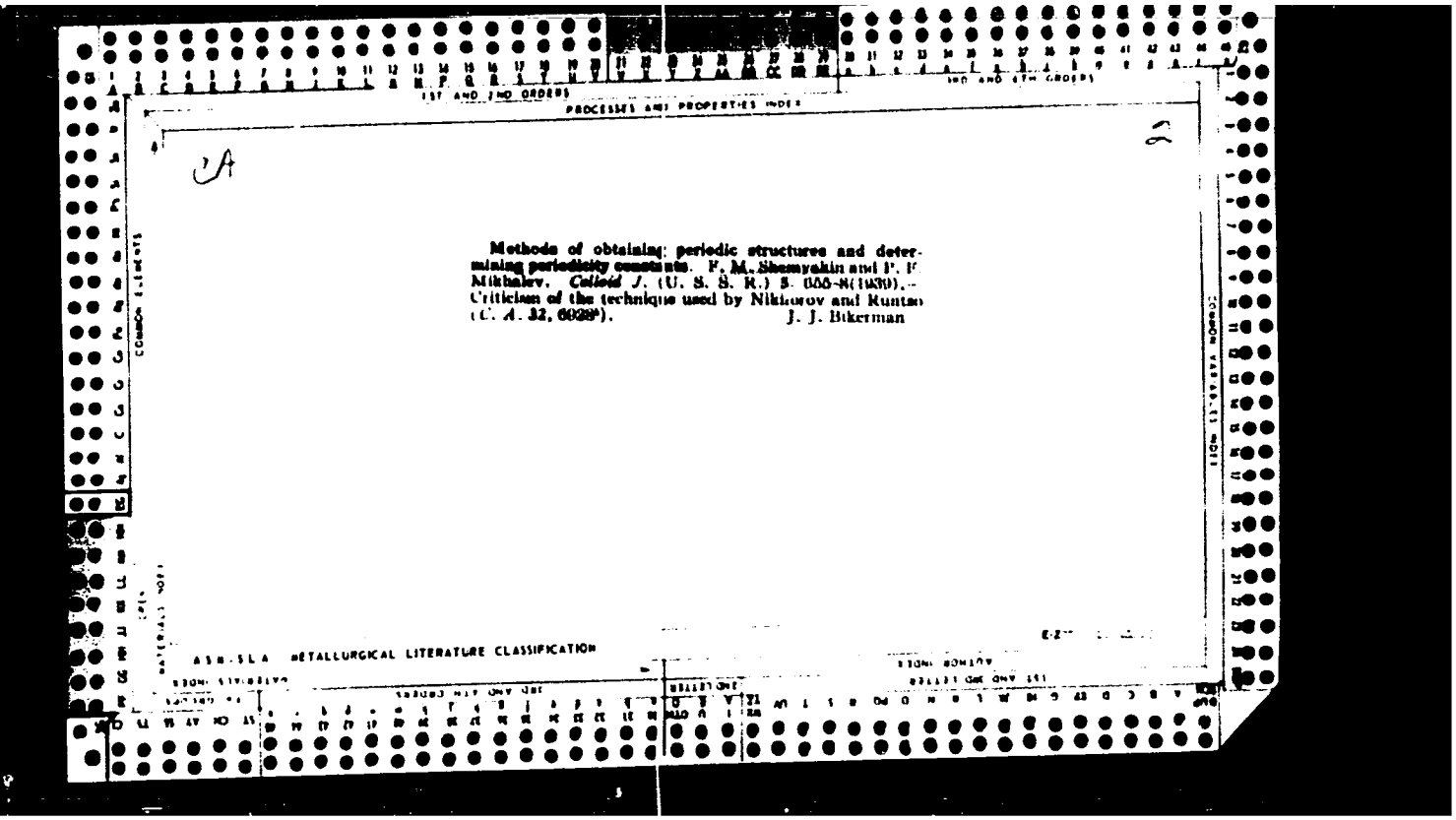
A-1

Drop reactions of vanadates and molybdates with 1-nitroso-2-naphthol. F. M. Schemjakin and A. N. Belokon (Compt. rend. Acad. Sci. U.R.S.S., 1938, **18**, 277—278).—A saturated EtOH solution of 1-2-NO·$C_{10}H_6$·OH (I) gives a dark-green ppt. with an alkaline solution of NH_4 vanadate, and a brownish-red ppt. from a solution acidified with HCl. In neutral solution, there is no pptn. The brownish-red ppt. is sol. in KOH, conc. HNO_3, conc. H_2SO_4, and conc. HCl (incompletely). In dil. HCl solution the sensitivity is $\sim 5 \times 10^{-4}$ g. per ml. Pptn. in AcOH solution is less complete. For a drop reaction on paper the sensitivity is $\sim 1 \times 10^{-3}$ g. per ml. AcOH and EtOH solutions of (I) form a red ppt. with an acid solution of NH_4 molybdate (cf. A., 1924, ii, 788). The action of acids and bases is similar to that with the V ppts. Used as a drop reaction on paper four rings, (inner) orange, lilac, yellow, blue, may appear; sensitivity, 10^{-4} g. Mo per ml. In a solution acidified with HCl, AsO_3''' gives a slight orange-red ppt. with (I). L. S. T.

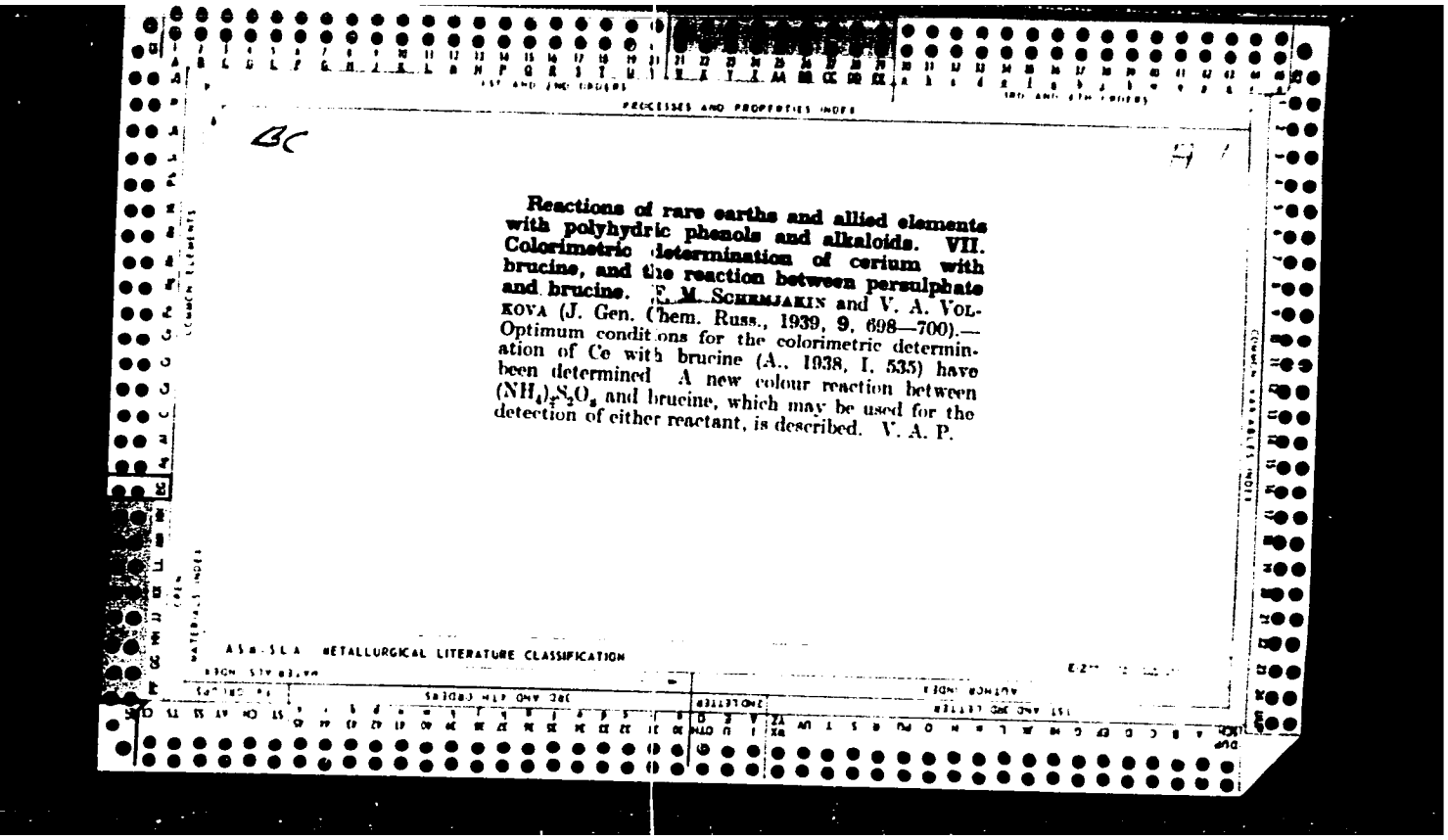


Determination of the quality of gelatin from the value of its periodicity constant I. M. Shumyakin [illegible] Zh. Fiz. Khim. S.S.S.R. 5, 213 18(1934). A gelatin can be characterized by the distances between the periodic points e. g., of $Ag_2Cr_2O_7$ or MgO in it. Tech. gelatin gives highest constes., and photographic gelatin lowest ones. J. J. Bikerman

A50 SLA METALLURGICAL LITERATURE CLASSIFICATION



Methods of obtaining periodic structures and determining periodicity constants. F. M. Shemyakin and P. F. Mikhalev. *Colloid J.* (U. S. S. R.) 5. 555-8(1939).—Criticism of the technique used by Nikitorov and Kuntse (*C. A.* 32, 6929⁹). J. J. Bikerman

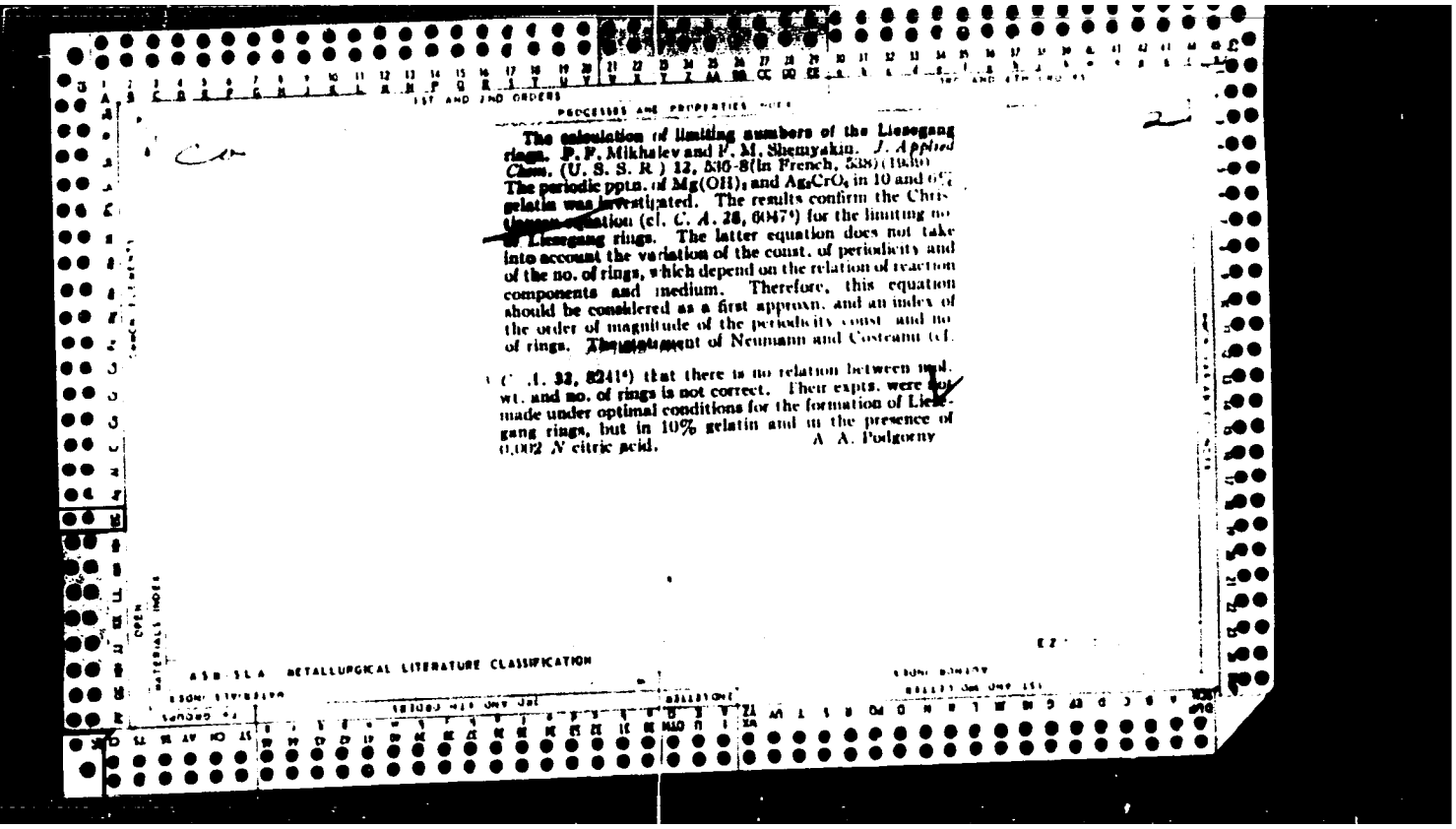


PROCESSES AND PROPERTIES INDEX

BC

Reactions of rare earths and allied elements with polyhydric phenols and alkaloids. VII. Colorimetric determination of cerium with brucine, and the reaction between persulphate and brucine. F. M. SCHEMJAKIN and V. A. VOLKOVA (J. Gen. Chem. Russ., 1939, 9, 698—700).—Optimum conditions for the colorimetric determination of Ce with brucine (A., 1938, I, 535) have been determined. A new colour reaction between $(NH_4)_2S_2O_8$ and brucine, which may be used for the detection of either reactant, is described. V. A. P.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

1ST AND 2ND ORDERS

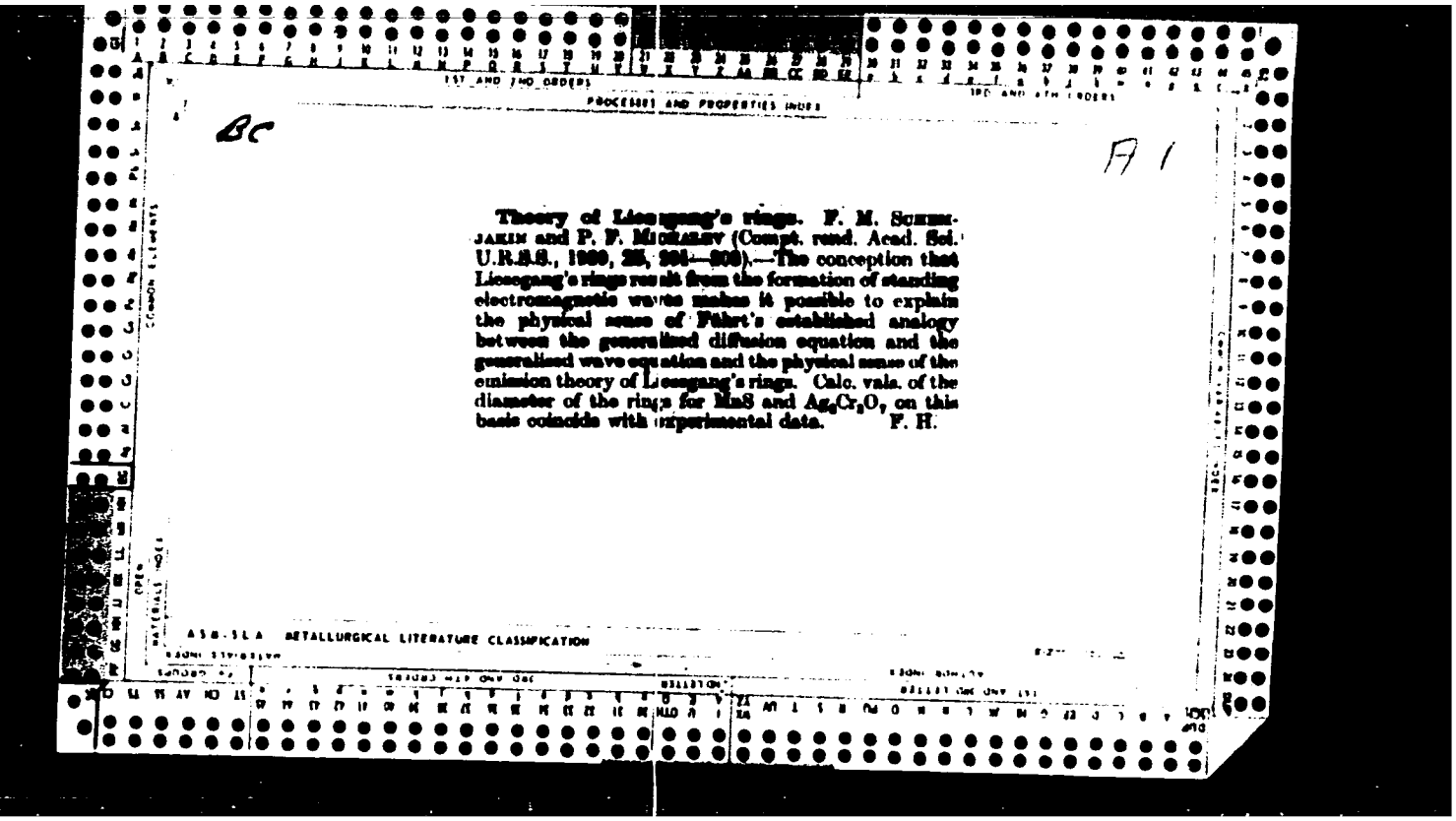
The calculation of limiting numbers of the Liesegang rings. P. P. Mikhalev and P. M. Shemyakin. *J. Applied Chem.* (U. S. S. R.) 12, 536-8(In French, 538)(1939). The periodic pptn. of $Mg(OH)_2$ and Ag_2CrO_4 in 10 and 0% gelatin was investigated. The results confirm the Chrisiansen equation (cf. *C. A.* 28, 6047[9]) for the limiting no. of Liesegang rings. The latter equation does not take into account the variation of the coust. of periodicity and of the no. of rings, which depend on the relation of reaction components and medium. Therefore, this equation should be considered as a first approxn. and an index of the order of magnitude of the periodicity coust and no. of rings. The statement of Neumann and Costeanu (cf. *C. A.* 32, 8241[4]) that there is no relation between mol. wt. and no. of rings is not correct. Their expts. were not made under optimal conditions for the formation of Liesegang rings, but in 10% gelatin and in the presence of 0.002 *N* citric acid.

A. A. Podgorny

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

SHEMYAKIN, F. M.

"Influence of Radiations during the Corrosion of Metals on the Destruction of Periodic Precipitates of $Ag_2Cr_2O_7$ in Gelatine," Dokl. Ak. Nauk, SSSR, 25 No. 1, 1939
Inst. Gen. and Inorganic Chem. im Kurnakov, Acad. Sci. USSR

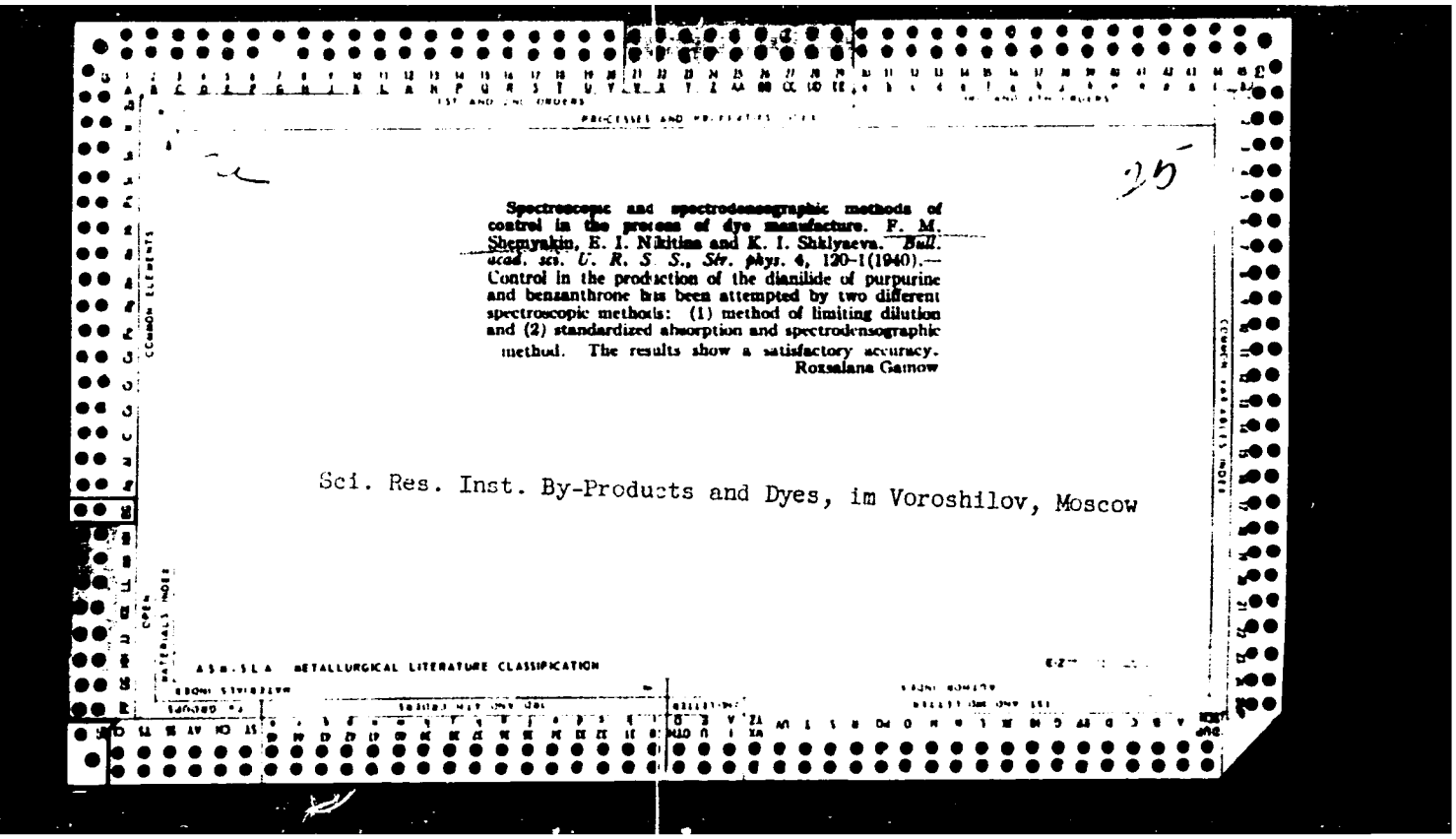


Bc

A 1

Theory of Liesegang's rings. F. M. Scumm-JAKIN and P. F. MIGERAEV (Compt. rend. Acad. Sci. U.R.S.S., 1939, 25, 204—208).—The conception that Liesegang's rings result from the formation of standing electromagnetic waves makes it possible to explain the physical sense of Fähr's established analogy between the generalised diffusion equation and the generalised wave equation and the physical sense of the emission theory of Liesegang's rings. Calc. vals. of the diameter of the rings for MnS and $Ag_2Cr_2O_7$ on this basis coincide with experimental data. F. H.

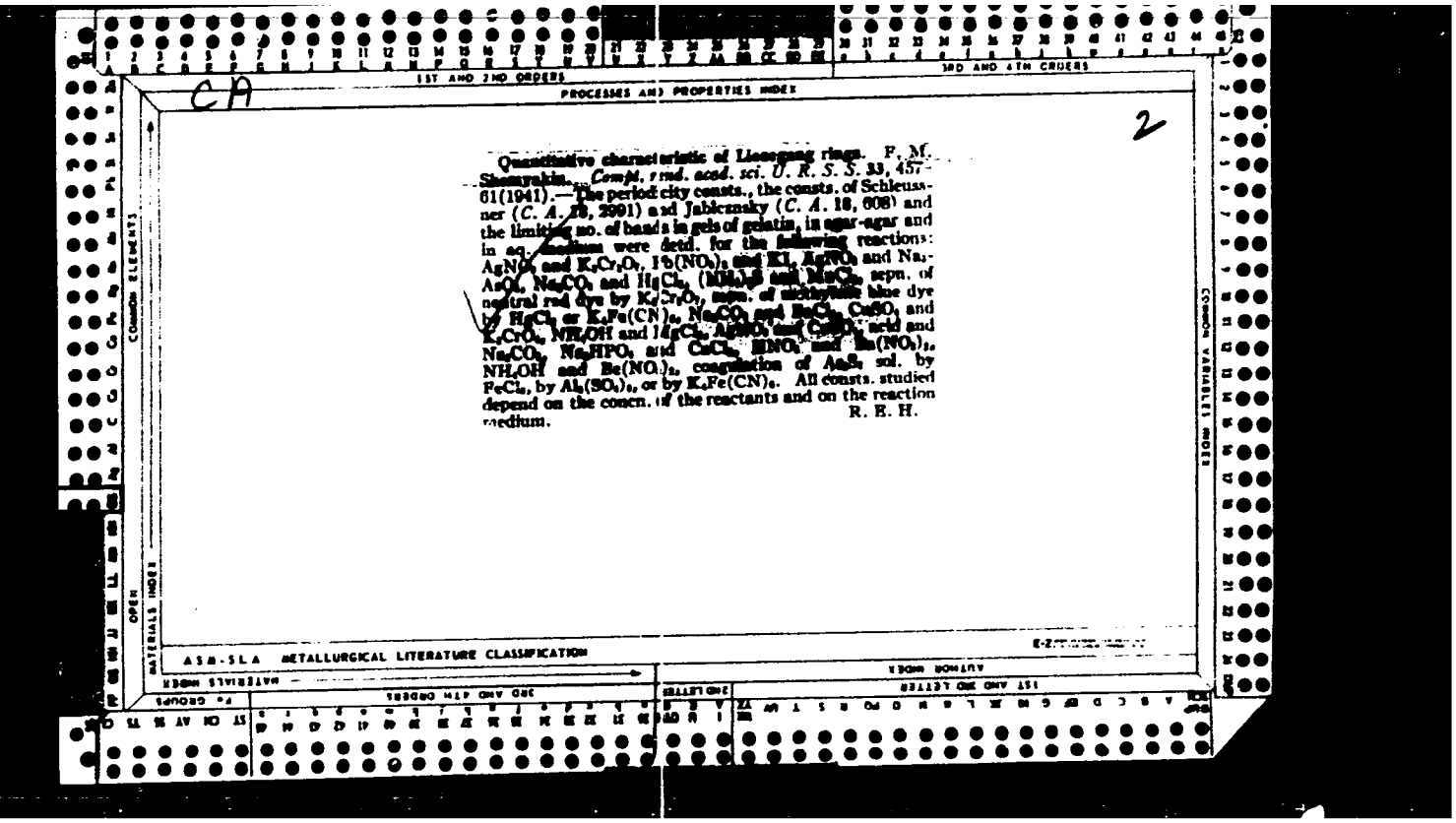
A 5 B - 5 L A METALLURGICAL LITERATURE CLASSIFICATION



Spectroscopic and spectrodensographic methods of control in the process of dye manufacture. F. M. Shemyakin, E. I. Nikitina and K. I. Shklyaeva. *Bull. acad. sci. U. R. S. S., Sér. phys.* 4, 120–1(1940).—Control in the production of the dianilide of purpurine and benzanthrone has been attempted by two different spectroscopic methods: (1) method of limiting dilution and (2) standardized absorption and spectrodensographic method. The results show a satisfactory accuracy.
Roxalana Gamow

Sci. Res. Inst. By-Products and Dyes, im Voroshilov, Moscow

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



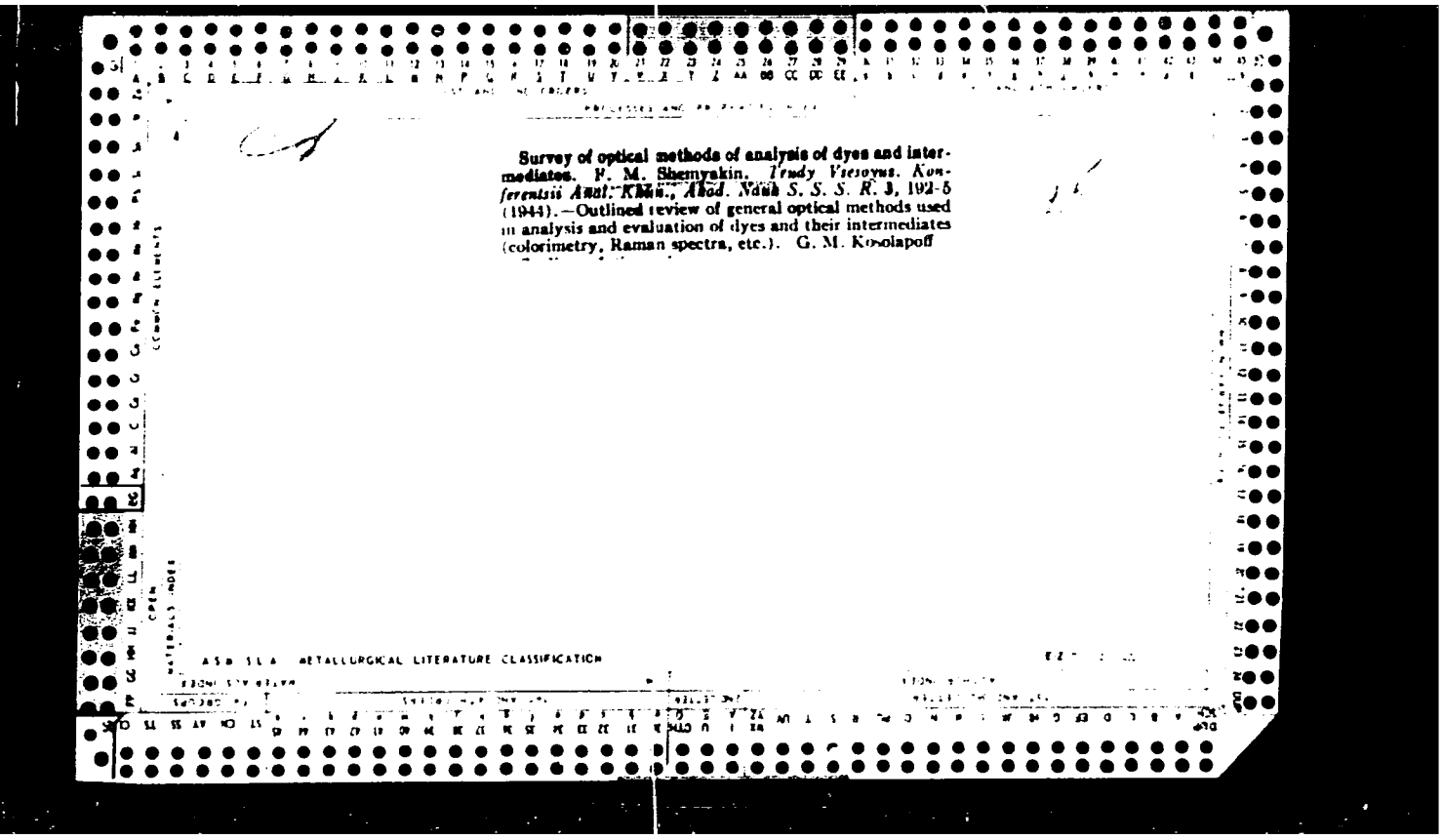
CA

2

PROCESSES AND PROPERTIES INDEX

Quantitative characteristic of Liesegang rings. F. M. Shemyakin. *Compt. rend. acad. sci. U. R. S. S.* 33, 457-61(1941).—The periodicity consts., the consts. of Schleussner (*C. A.* 28, 2991) and Jablczynsky (*C. A.* 18, 608) and the limiting no. of bands in gels of gelatin, in agar-agar and in aq. medium were detd. for the following reactions: $AgNO_3$ and $K_2Cr_2O_7$, $Pb(NO_3)_2$ and KI, $AgNO_3$ and Na_3AsO_4, Na_2CO_3 and $HgCl_2$, $(NH_4)_2S$ and $MnCl_2$, sepn. of neutral red dye by $K_2Cr_2O_7$, sepn. of nickeliferous blue dye by $HgCl_2$ or $K_4Fe(CN)_6$, Na_2CO_3 and $BaCl_2$, $CuSO_4$ and K_2CrO_4, NH_4OH and $HgCl_2$, $AgNO_3$ and $(CaO)_2$, acid and Na_2CO_3, Na_2HPO_4 and $CaCl_2$, HNO_3 and $Bi(NO_3)_3$, NH_4OH and $Be(NO_3)_2$, coagulation of As_2S_3 sol. by $FeCl_3$, by $Al_2(SO_4)_3$, or by $K_4Fe(CN)_6$. All consts. studied depend on the concn. of the reactants and on the reaction medium.

R. E. H.



Survey of optical methods of analysis of dyes and intermediates. P. M. Shemyakin. *Trudy Vsesoyus. Konferentsii Anal. Khim., Akad. Nauk S. S. S. R.* **3**, 192-5 (1944).—Outlined review of general optical methods used in analysis and evaluation of dyes and their intermediates (colorimetry, Raman spectra, etc.). G. M. Kosolapoff

ASB STA METALLURGICAL LITERATURE CLASSIFICATION

USSR/Chemistry - Ions - Transfer Nov 1947
Chemistry - Chromatography - Adsorption

"Chromatographic Transfer Adsorption of Ions," T. B. Gapon, Ye. N. Gapon, F. M. Shemyakin, Moscow Agricultural Academy imeni K. A. Timiryazev, 3 pp

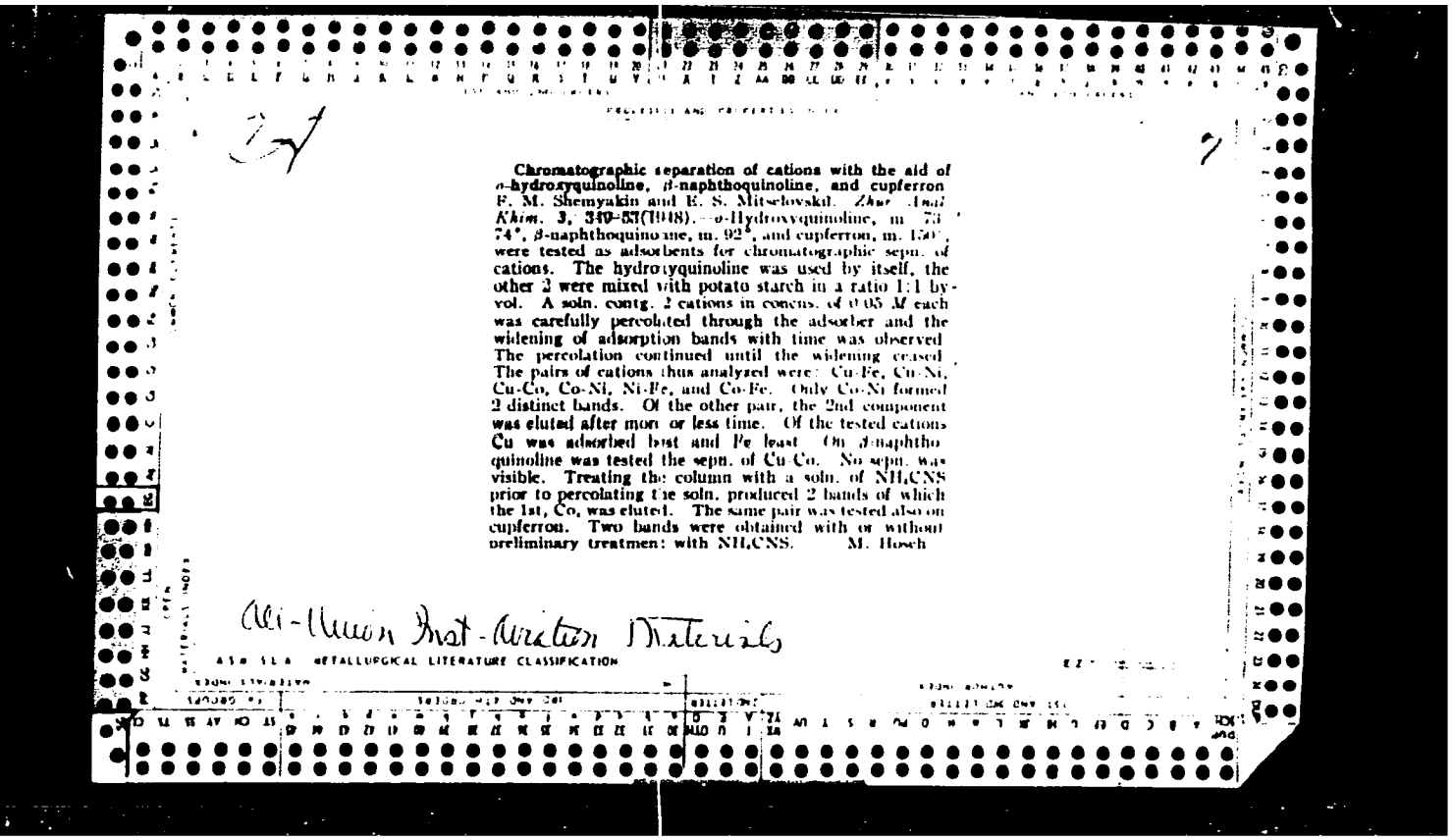
"Dok Ak Nauk" Vol LVIII, No 4

Theory of Transfer a sorption of ions has been worked out sufficiently. Authors discuss the isotherm equation for the transfer of two ions. It was developed by one of the authors and has the form:

$$\frac{S_1}{S_2} = K_{12} \frac{a_1^{\frac{1}{z_1}}}{a_2^{\frac{1}{z_2}}}$$

where S_1, S_2 - are the amounts of adsorbed ions, a_1, a_2 - the activity of the ions in the solution, and z_1, z_2 - the valencies of the ions. Submitted by Academician M. M. Dubinin, 13 Apr 1947.

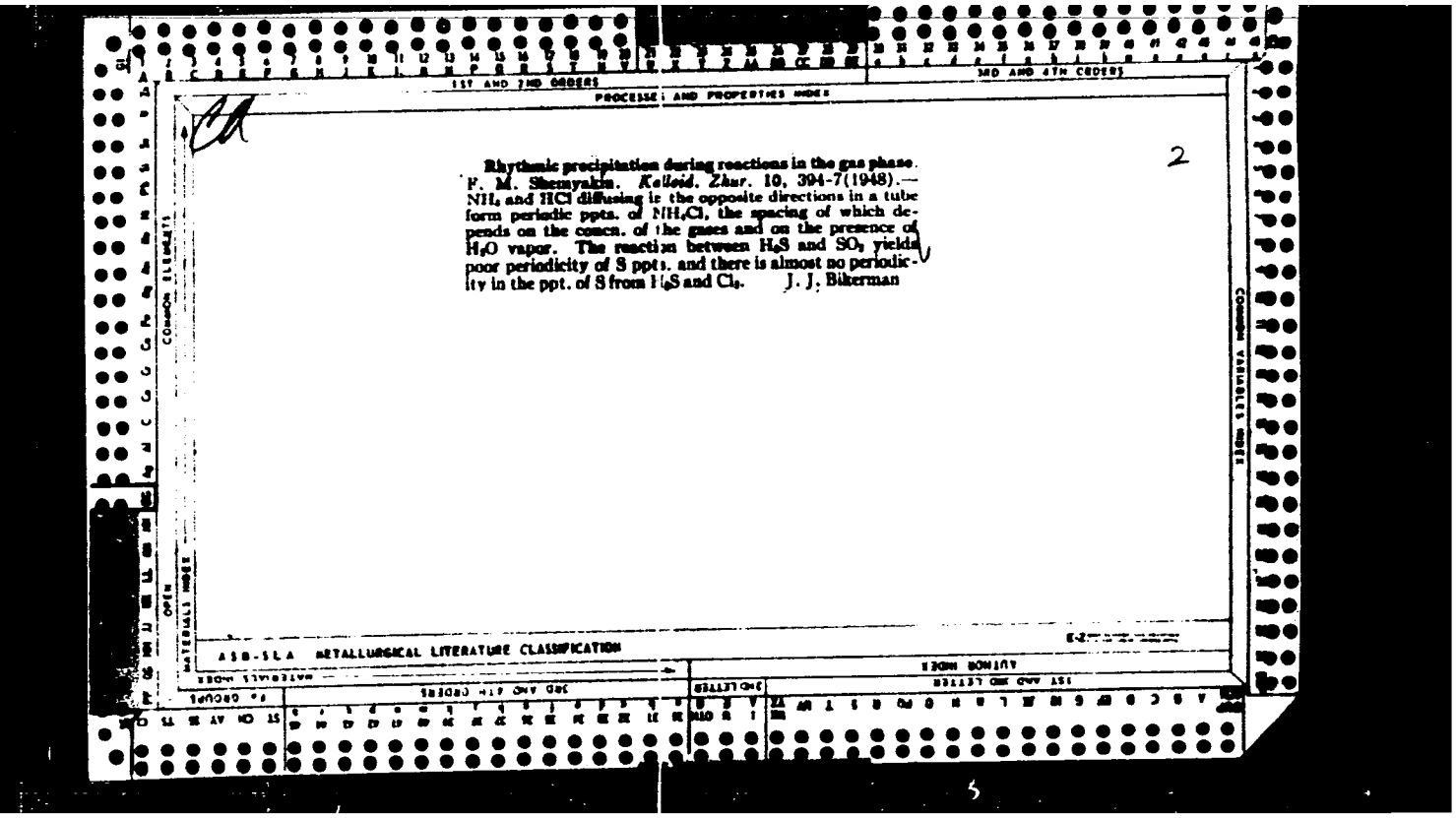
PA 3979



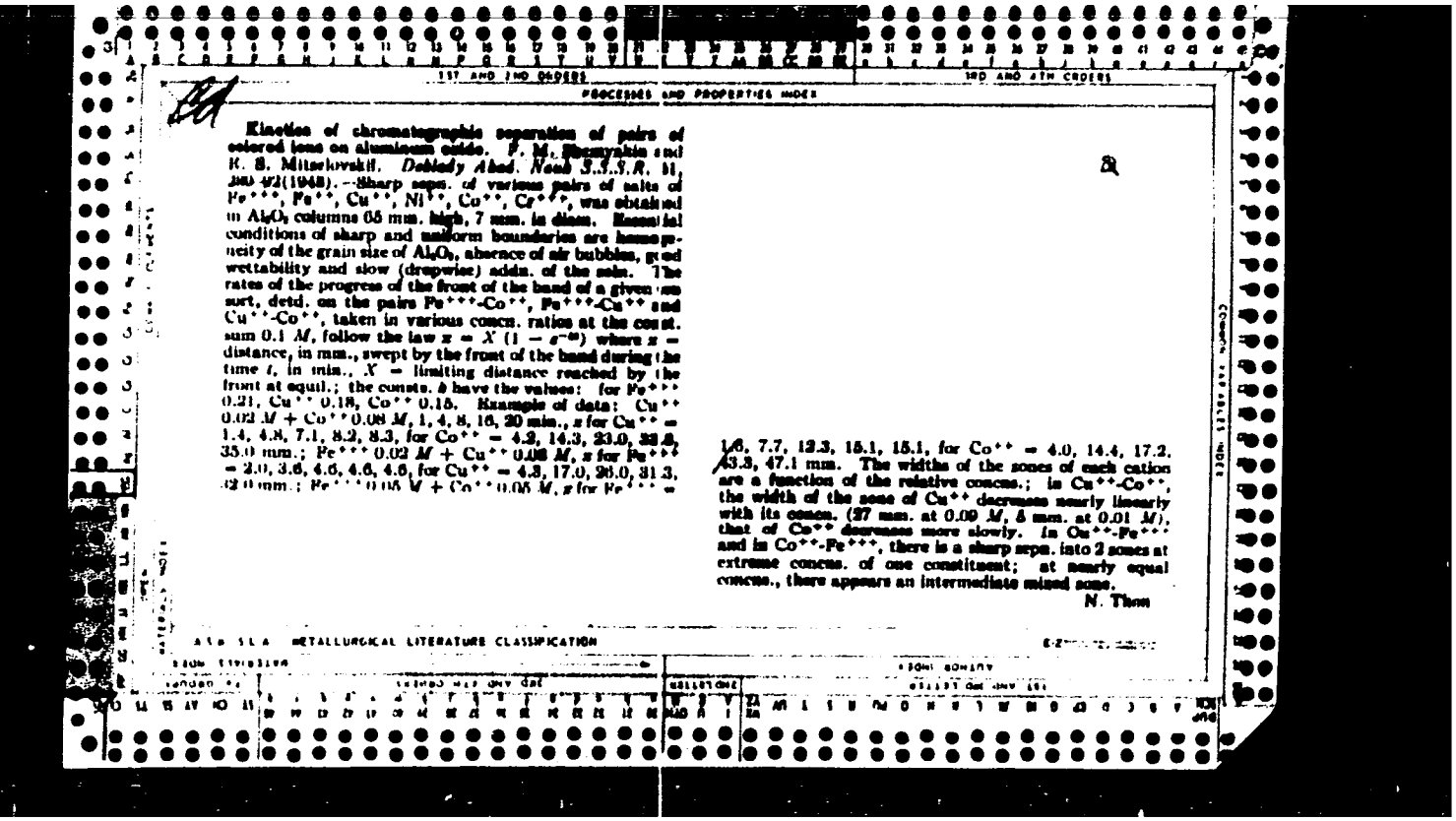
Chromatographic separation of cations with the aid of o-hydroxyquinoline, β-naphthoquinoline, and cupferron F. M. Shemyakin and E. S. Mitselovskii. *Zhur. Anal. Khim.* 3, 349–53(1948).—o-Hydroxyquinoline, m. 73–74°, β-naphthoquinoline, m. 92°, and cupferron, m. 150°, were tested as adsorbents for chromatographic sepn. of cations. The hydroxyquinoline was used by itself, the other 2 were mixed with potato starch in a ratio 1:1 by vol. A soln. contg. 2 cations in concns. of 0.05 *M* each was carefully percolated through the adsorber and the widening of adsorption bands with time was observed. The percolation continued until the widening ceased. The pairs of cations thus analyzed were: Cu-Fe, Cu-Ni, Cu-Co, Co-Ni, Ni-Fe, and Co-Fe. Only Co-Ni formed 2 distinct bands. Of the other pair, the 2nd component was eluted after more or less time. Of the tested cations Cu was adsorbed best and Fe least. On β-naphthoquinoline was tested the sepn. of Cu-Co. No sepn. was visible. Treating the column with a soln. of NH_4CNS prior to percolating the soln. produced 2 bands of which the 1st, Co, was eluted. The same pair was tested also on cupferron. Two bands were obtained with or without preliminary treatment with NH_4CNS. M. Hosch

All-Union Inst. Aviation Materials

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION



Rhythmic precipitation during reactions in the gas phase. F. M. Shemyakin. *Kolloid. Zhur.* 10, 394-7(1948).—NH_3 and HCl diffusing in the opposite directions in a tube form periodic ppts. of NH_4Cl, the spacing of which depends on the concn. of the gases and on the presence of H_2O vapor. The reaction between H_2S and SO_2 yields poor periodicity of S ppts. and there is almost no periodicity in the ppt. of S from H_2S and Cl_2. J. J. Bikerman



1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Kinetics of chromatographic separation of pairs of colored ions on aluminum oxide. P. M. Shemyakin and K. S. Mitselovskii. *Doklady Akad. Nauk S.S.S.R.* 61, 289-92(1948).—Sharp sepn. of various pairs of salts of Fe^{+++}, Fe^{++}, Cu^{++}, Ni^{++}, Co^{++}, Cr^{+++}, was obtained in Al_2O_3 columns 65 mm. high, 7 mm. in diam. Essential conditions of sharp and uniform boundaries are homogeneity of the grain size of Al_2O_3, absence of air bubbles, good wettability and slow (dropwise) addn. of the solns. The rates of the progress of the front of the band of a given constituent, detd. on the pairs Fe^{+++}-Co^{++}, Fe^{+++}-Cu^{++} and Cu^{++}-Co^{++}, taken in various concn. ratios at the const. sum 0.1 *M*, follow the law $x = X(1 - e^{-kt})$ where x = distance, in mm., swept by the front of the band during the time t, in min., X = limiting distance reached by the front at equil.; the consts. k have the values: for Fe^{+++} 0.21, Cu^{++} 0.18, Co^{++} 0.15. Example of data: Cu^{++} 0.02 *M* + Co^{++} 0.08 *M*, 1, 4, 8, 16, 20 min., x for Cu^{++} = 1.4, 4.8, 7.1, 8.2, 8.3, for Co^{++} = 4.2, 14.3, 23.0, 32.8, 35.0 mm.; Fe^{+++} 0.02 *M* + Cu^{++} 0.08 *M*, x for Fe^{+++} = 2.0, 3.6, 4.6, 4.6, 4.6, for Cu^{++} = 4.3, 17.0, 26.0, 31.3, 32.0 mm.; Fe^{+++} 0.05 *M* + Co^{++} 0.05 *M*, x for Fe^{+++} = 1.6, 7.7, 12.3, 15.1, 15.1, for Co^{++} = 4.0, 14.4, 17.2, 43.3, 47.1 mm. The widths of the zones of each cation are a function of the relative concns.; in Cu^{++}-Co^{++}, the width of the zone of Cu^{++} decreases nearly linearly with its concn. (27 mm. at 0.09 *M*, 5 mm. at 0.01 *M*), that of Co^{++} decreases more slowly. In Cu^{++}-Fe^{+++} and in Co^{++}-Fe^{+++}, there is a sharp sepn. into 2 zones at extreme concns. of one constituent; at nearly equal concns., there appears an intermediate mixed zone.

N. Thon

A 1 a S L A METALLURGICAL LITERATURE CLASSIFICATION